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Technical Report: 4.11

Strategic Environmental Assessment (SEA)
Environmental Report Supporting Appendices

Draft Water Resources Management Plan 2020-2080

November 2017



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Affinity Water Draft Water Resources Management Plan 2019: Strategic Environmental Assessment (SEA)

Environmental Report Supporting Appendices

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Appendix I: Regulatory requirements

Environmental report must include:	Where in the Environmental Report has this been addressed?
(a) an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes;	This is provided in Chapter 2 of the Environmental Report.
(b) the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;	This is provided in Chapter 3 of the Environmental Report and Appendix II.
(c) the environmental characteristics of areas likely to be significantly affected;	Provided in Appendix II.
(d) any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC (The Birds Directive) and 92/43/EEC (The Habitats Directive);	This is provided in Chapter 3 of the Environmental Report and Appendix II.
(e) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;	Provided in Appendix II.
(f) the likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors;	These are set out in Chapters 4, 5 and 6 of the Environmental Report as well as Appendix V.
(g) the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme;	These are set out in Chapters 4, 5 and 6 of the Environmental Report as well as Appendix V.
(h) an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;	The outline reasons for the selection or rejection of alternatives are provided in Chapter 4 of the Environmental Report.
(i) a description of the measures envisaged concerning monitoring in accordance with Article 10;	There are provided in Chapter 7 of the Environmental Report.
(j) a non-technical summary of the information provided under the above headings.	A separate Non-technical summary has been prepared.

Appendix II: Scoping information

Population and Human Health

This section sets out the policy context and the environmental baseline with respect to population (e.g. demographics and population characteristics including future growth) and human health.

Policy context

The section below includes some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** 'Policy, plan and programme review'.

Table 1.1. Key messages from the review of the policies, plans and programmes

Document title	Key message
National Planning Policy Framework (NPPF)	<p>The NPPF sets out the government's view on sustainable development as defined in a planning context.</p> <p>Key messages from the NPPF which relate to population, economy and human health include:</p> <p>The social role of the planning system involves 'supporting vibrant and healthy communities';</p> <p>The planning system can play an important role in facilitating social interaction and creating healthy, inclusive communities;</p> <p>The need to promote the retention and development of local services and community facilities such as local shops, meeting places, sports venues, cultural buildings, public houses and places of worship;</p> <p>The need to ensure that developments create safe and accessible environments where crime and disorder, and the fear of crime, do not undermine quality of life or community cohesion;</p> <p>A core planning principle is to 'take account of and support local strategies to improve health, social and cultural wellbeing for all';</p> <p>Set out the strategic policies to deliver the provision of health facilities; and</p> <p>Access to high-quality open spaces and opportunities for sport and recreation can make an important contribution to the health and wellbeing of communities.</p>
Local Plans	<p>All Local Plans post -2012 need to demonstrate they are in conformity with the NPPF and therefore deliver sustainable development. Recent changes to planning policy with regard to building standards means that they have less power / more of an evidence burden in developing policies that exceed the Building Regulations. In the context of water stressed areas this could make the implementation of some demand management measures more challenging.</p>

Source: Annex A

Baseline review

The WRMP2014 population and household forecasts for the Central and Southeast regions are set out in **Tables 3.2** and **3.3**.

Table 1.2. Current and future population forecasts

WRZ	2012/13	2020	2040	% increase 2040
1	324,720	336,288	363,552	12%
2	435,936	452,462	498,945	14%
3	<u>699,253</u>	<u>732,431</u>	<u>845,584</u>	<u>21%</u>
4	<u>969,315</u>	<u>1,012,742</u>	<u>1,145,982</u>	<u>18%</u>
5	<u>289,142</u>	<u>307,418</u>	<u>362,351</u>	<u>25%</u>

WRZ	2012/13	2020	2040	% increase 2040
6	526,614	545,207	604,945	15%
Central (sub-total)	3,244,980	3,386,547	3,821,360	18%
Southeast (7)	169,008	180,275	188,462	12%

Source: WRMP2014

Table 1.3. Current and future households (number of properties)

WRZ	2012/13	2020	2040	% increase 2040
1	129,148	133,873	144,982	12%
2	164,349	171,231	191,837	17%
<u>3</u>	<u>263,385</u>	<u>278,431</u>	<u>329,472</u>	<u>25%</u>
<u>4</u>	<u>331,358</u>	<u>351,313</u>	<u>417,198</u>	<u>26%</u>
<u>5</u>	<u>111,813</u>	<u>120,200</u>	<u>144,883</u>	<u>30%</u>
6	192,458	201,030	230,256	20%
Central (sub-total)	1,192,512	1,256,079	1,458,627	22%
Southeast (7)	69,436	76,089	83,719	21%

Source: WRMP2014

Central region

The Central region has a total population of 3,244,980 which is expected to grow by 18% by 2040 (with a corresponding increase in households of 22%). Within the Central region, WRZs 3, 4 and 5 (underlined in **Table 1.2** and **Table 1.3** above) will have the highest levels of population and household growth. These WRZs coincide with the major growth areas of Luton and Stevenage (WRZ3), Edgware (WRZ4), Harlow, and Saffron Waldon (WRZ5).

The Index of Multiple Deprivation (IMD) ranks every small area in England from 1 (most deprived) to 32,844 (least deprived). The IMD is a combination of information from seven 'domains' that produces and overall relative measure of deprivation.¹ The areas with the worst IMD score (the worst 0-20% of Lower Super Output Areas (LSOAs)) are around the London fringe (Harrow, Barnet and Potters Bar), as well as the Luton and Harlow areas (**see Vol2 Figure 1.1**).

Local Planning Authorities, e.g. Harlow, Epping Forest, East Herts and Uttlesford, are working to regenerate areas of deprivation and to deliver high levels of housing and economic growth. This will increase water demand but also provide an opportunity; new development will implement more stringent planning policies, therefore potentially encouraging improved water reuse and demand management opportunities.

With regard to the health of the population, 83.52% of residents within the Central region were characterised as being in 'good' or 'very good' health which is above the UK average (81.39%). Further analysis of the Health Deprivation and Disability Domain reveals that health deprivation is particularly acute in areas around Luton and Harlow (**see Vol2 Figure 1.3**).² This higher level of deprivation may indicate the presence of populations sensitive to fluctuations in water chemistry and cost.

¹ The domains and their weighting are: Income Deprivation (22.5%), Employment Deprivation (22.5%), Education, Skills and Training Deprivation (13.5%), Health Deprivation and Disability (13.5%), Crime (9.3%), Barriers to Housing and Services (9.3%), and Living Environment Deprivation (9.3%)

² Census (2011) QS302EW - general health [online] available at: <https://www.nomisweb.co.uk/query/construct/summary.asp?menuopt=200&subcomp=> Accessed September 2016

Southeast region

As of 2012/2013, the Southeast region had a total population 169,008. This is expected to have grown by 12% by 2040 (with a corresponding increase of 21% in households). Within the region the main urban areas (which have relatively higher population densities than more rural areas) include Folkestone and Dover. At the time of the 2011 Census, these towns had populations of 61,060 and 38,959 respectively³. In addition to permanent residents, the Southeast region can have high numbers of visitors particularly during the summer (5.1 million staying visits in 2015⁴), which is in part due to the good transport links with the continent.

LSOAs within Folkestone and Dover are amongst the 20% most deprived in England - **see Vol 2 Figure 1.2 and 3.4** (presented in this report, subsequent to the scoping information). Deprivation is also present in more rural areas of the Southeast region including Romney Marsh, Hythe and New Romney. At the time of the 2011 Census, 83.64% of residents within the Central region were characterised as being in 'good' or 'very good' health, compared to the national average (81.39%).⁵

Future environment without the dWRMP2019

The population in the SEA Study Area is predicted to increase by an average of 15% from the current level of 3.6 million to approximately 4 million in 2040. Correspondingly, there will also be a 21.5% growth in households by 2040 to give a total of 1.5 million. The larger increase in *additional households* reflects a move towards smaller household sizes (and therefore greater per capita resource consumption).

The projected increases in population along with a baseline supply deficit will create pressure on existing water resources. This is intensified due to Affinity Water customers having one of the highest per capita consumption (PCC) figures in the UK (in the Central region there is a high weighted average PCC of 166 litres / person / day compared to the national average of 147l/p/d).⁶

Without the dWRMP2019, the current plan is likely to roll forward with sustainability reductions and demand management options. However, all the Local Planning Authorities in the Study Area will likely be looking to grow their housing stock in line with population projections, increasing demand. Additionally, over an 80 year time frame, the effects of climate change in terms of both an interrupted water supply and fluctuating rainfall patterns will also add pressure on future water resource planning.

Key comments from previous consultation responses

Natural England highlighted that the SEA Directive and Regulations are "*clearly specific to environmental issues*". Natural England, therefore, felt that reference to economic impacts should be removed from the objectives and scope of the SEA, including from the Population, Economy and Human Health topic. References to specific economic objectives have not been included in this report nor in the evidence base.

No significant effects for this topic were predicted for the WRMP14 SEA for either construction or operation.

Key issues

Key issues likely to arise during the lifetime of the dWRMP2019 are as follows:

- The Central region, in particular, will experience high levels of development and growth;
- Both regions have 'hotspots' of deprivation. Vulnerable people may be at disproportionate risk of effects of changes in the cost of water;

³ Census (2011) QS10SEW – population density [online] available at: <http://www.neighbourhood.statistics.gov.uk/dissemination/LeadPage.do?pageId=1004&tc=1475577628547&a=5&b=6275080&c=dover&d=13&e=61&f=33488&g=6436833&i=1001x1003x1032x1004x1005&l=2491&o=362&m=0&r=1&s=1475577628547&nc=1> Accessed September 2016

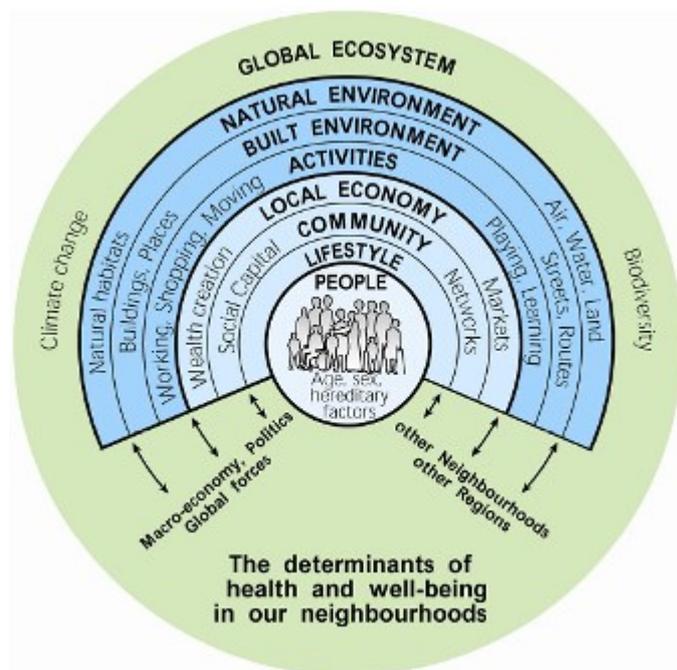
⁴ ONS (2016) International Passenger Survey [online] @ <https://www.visitbritain.org/nation-region-county-data>. Accessed November 2016.

⁵ Ibid

⁶ Affinity Water (2014) Final Water Resources Management Plan 2015-2020

- The Study Area will experience a combination of the impacts of climate change, population increase, sustainability reductions and water stress. All of these factors create a challenging environment for Affinity Water to deliver a sustainable water supply; and
- It is important to note that human health and wellbeing have strong inter-relationships with all of the other topics in the scope of the SEA. These are highlighted in **Figure 1.1** which illustrates the 'determinants of health' i.e. the range of factors that combine together to affect the health of individuals and communities.

Figure 1.1. Determinants of health⁷



Proposed SEA scope

Pressure from a growing population (and increases in future households) is likely to increase the demand for water in the Study Area. Also, the supply of water is a factor in the ability of the region to develop and grow through providing new developments (e.g. Harlow) with an adequate supply of water.

Access to clean water is a key determinant of human health and, as such, this has the potential to affect the health of the population within the Study Area e.g. if water is unavailable or the water supply is altered or interrupted.

An increasing population is a key driver for increased demand but population itself is not seen as something that can be influenced by the dWRMP2019 (i.e. options are unlikely to affect the population or demographics). It is proposed that for this SEA, the effects on population should not be considered.

The effect that options might have on regeneration areas is something that can be influenced by the dWRMP2019 (e.g. developing supplies close to main areas of growth and ensuring resilience of supply). It is therefore proposed that for this SEA, the effects on regeneration should be considered.

Health can be affected indirectly and directly by the availability of water. It is proposed that for this SEA, the effects on health and wellbeing should be assessed. **Table 1.4** presents the SEA objectives and appraisal questions that will be used for the assessment of the effects of the dWRMP2019 on regeneration, health and wellbeing.

⁷ Local Government Association (2010) Social, economic and environmental determinants of health [online] @ http://www.local.gov.uk/health/-/journal_content/56/10180/3511260/ARTICLE/ Accessed September 2016

Table 1.4. SEA Framework of objectives and assessment questions:

SEA objective (will the DWRMP2019...?)	Assessment questions (would the options / programme)	Link to key issue
Ensure the availability of adequate supply, and quality, of water in order to support health and wellbeing along with the regeneration ambitions of the Study Area?	Enable the growth ambitions of the Study Area to be realised?	The Central region, in particular, will experience high levels of development and growth.
	Provide affordable access to clean water adequate to support health?	Health can be affected indirectly and directly by the availability and quality of water.
	Ensure that customers are not disproportionality affected by cost?	Both regions have 'hotspots' of deprivation. Vulnerable people may be at risk of disproportionate effects of changes in the cost of water.

Tourism and Recreation

This section sets out the policy context and the environmental baseline with respect to tourism and recreation (including countryside access). It is important to note that tourism and recreation have significant inter-relationships with other topics; in particular, biodiversity and nature conservation, human health, landscape character, and cultural heritage.

Policy context

The section below includes some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** 'Policy, plan and programme review'.

Table 2.1. Key messages from the review of the policies, plans and programmes

Document title	Key message
Area of Outstanding Natural Beauty (AONB) Management Plans	<p>An AONB is an area of countryside in England, Wales or Northern Ireland which has been designated for conservation due to its significant landscape value through the Countryside and Rights of Way Act 2000. AONBs are designated in recognition of their national importance, by Natural England, Natural Resources Wales, or the Northern Ireland Environment Agency. AONBs are provided with a degree of protection from development similar to those of national parks and are largely managed by local authority advisory committees. There are three AONB's located within the Study Area. Two within the Central region (Chilterns, and Surrey Hills) and one within the Southeast region (Kent Downs).</p> <p>The Chilterns AONB⁸ management plan sets out the following elements in its vision:</p> <ul style="list-style-type: none"> • Conserving and enhancing natural beauty; • Increasing understanding and enjoyment; and • Fostering social and economic wellbeing. <p>The Surrey Hills AONB⁹ management plan sets out the following vision:</p> <p><i>"The Surrey Hills AONB is recognised as a national asset in which its natural and cultural resources are managed in an attractive landscape mosaic of farmland, woodland, heaths, downs and commons. It provides opportunities for appropriate business enterprise and for all to enjoy and appreciate its natural beauty."</i></p> <p>The Kent Downs AONB¹⁰ management plan emphasises the importance of the following elements in its vision:</p> <ul style="list-style-type: none"> • Sustainable development; • Landform and landscape character; • Biodiversity; • Farmed landscape; • Woodland and trees; • Historic and cultural heritage; • Heritage Coasts; • Geology and natural resources; • Vibrant communities; and • Access, enjoyment and understanding.

⁸ The Chilterns Conservation Board (2014) Chilterns Area of Outstanding Natural Beauty Management Plan 2014-2019 [online] available at: http://www.chilternsaonb.org/uploads/files/ConservationBoard/ManagementPlan/Management%20Plan%202014-19/chilterns_management_plan_2014-19_final.pdf. Accessed September 2016

⁹ Surrey Hills Board (2014) Surrey Hills Area of Outstanding Natural Beauty Management Plan 2014-2019 [online] available at: <http://surreyhills.akikodesign.com/wp-content/uploads/2014/12/Surrey-Hills-Management-Plan-17b-SP.pdf>. Accessed September 2016.

¹⁰ Kent Downs AONB Unit (2014) Kent Downs Area of Outstanding Natural Beauty Management Plan 2014 - 2019 [online] available at: http://www.kentdowns.org.uk/uploads/documents/KD_AONB_final_plan_09.09.14.compressed.pdf. Accessed September 2016

Document title	Key message
Local Plans	<p>In terms of local context, local authorities produce Local Plans which provide guidance to developers on planning policy. Every Local Plan contains policies which are relevant to tourism and recreation within the local authority area as they set out how development policies that cover <i>inter alia</i>:</p> <ul style="list-style-type: none"> • Increasing tourism in the area; and • Protecting designated landscapes.

Source: Annex A

Baseline review

Central region

The Central region is home to a number of major airports (Heathrow, Luton, and Stansted) which provide domestic and international tourism links. There are a number of other routes which provide access to tourist hotspots in southern England and Wales. This includes the M4 corridor which provides access to South Wales and the South West, and the M3 which provides access to Hampshire (including the South Downs National Park). London also acts as a major tourist hub with 18.6m international visits in 2015. This was an increase of 1.2 million (6.8%) from 2014.¹¹ The Chilterns AONB on the north west fringes of the Central region and the Surrey Hills to the south also attract tourists. Additionally, within the Study Area there are a range of areas with biodiversity value which are used for recreation (see Chapter 6 'Biodiversity, flora and fauna' for more details).

Sport England designates 'significant areas for sport' (SASP). This designation "*recognises the most important sites for individual sports.*"¹² The Central region includes the following SASPs:

- River Wey (canoeing) in Weybridge;
- (Draft) Chertsey Weir (canoeing) in Chertsey;
- Dunstable Airfield (gliding) in Dunstable;
- John Battleday Water Ski (water skiing) at Thorpe Park; and
- Heron Lake (water skiing) in Wraysbury.

The Lee Valley White Water Centre, opened as part of the 2012 Olympics, is not in the Operating Area for Affinity Water but is nonetheless a significant tourist attraction. It is important as a number of water bodies (e.g. the Rivers Roding and Stort) feed into the River Lee and provide water that supports flows in the vicinity of this attraction.

Southeast region

The ferry port of Dover and the Eurotunnel connection at Folkestone provide key international access routes to and from the Southeast region. This means that the region can see large numbers of visitors (5.1 million staying visits in 2015¹³). This is set to increase in the future, with expansion likely as a result of the Dover Western Docks Revival. As such, tourism is important to the local economy, and has the potential to increase stress on water supply. This is most likely to occur during the summer months due to the combination of an influx of domestic and international tourists which coincides with reductions in supply that can occur during summer months due to dryer conditions.

The Kent Downs AONB, Heritage Coasts and other heritage assets in the region are also likely to draw tourists, as well as the opportunity for recreational boating, and other water based recreation activities. No SASPs have been identified in the Southeast region.

¹¹ ONS (2016) Travel Trends 2015 [online] available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/leisureandtourism/articles/traveltrends/2015> Accessed September 2016

¹² Sport England (2016) SASP Register [online] @ <https://www.sportengland.org/facilities-planning/planning-for-sport/planning-tools-and-guidance/significant-areas-for-sport/sasp-register/>. Accessed September 2016.

¹³ ONS (2016) International Passenger Survey [online] @ <https://www.visitbritain.org/nation-region-county-data>. Accessed November 2016.

Future environment without the dWRMP2019

Domestic tourism and its contribution to the South East of England's economy decreased prior to 2014 reflecting a decline in overall levels of tourism (a 9% fall in domestic trips compared to 2013). Tourism in the Central Region increased over the same period. With regard to the future of tourism, the decision to leave the European Union may have an impact on both international tourist arrivals and domestic tourism; at this stage it is impossible to estimate the degree to which this will change. The government's endorsement of the recommendation of the Airports Commission to expand Heathrow rather than Gatwick airport will be a driver for further pressure on the water supply in the Central region.

In the absence of the dWRMP2019, the increase in demand on water supply could have an effect on water sensitive recreational activities and tourism. This may result in local economic impacts.

Key comments from previous consultation responses

Natural England highlighted that the SEA Directive and Regulations are "*clearly specific to environmental issues*". Natural England, therefore, felt that reference to economic impacts from the objectives and scope of the SEA, including in the Tourism and Recreation topic should be removed. However, it is considered that the impacts of water resource options on land use, and recreation and tourism can have important knock-on effects for the regional economy. As such; the economy has been discussed as part of the baseline.

No significant effects on tourism and recreation were predicted for the WRMP14 SEA resulting from either construction or operation.

Key issues

- Tourism and recreation provide both valuable benefits to health and wellbeing and also contribute towards local economies. There are a number of SASPs and tourism 'hotspots' in the Study Area;
- Tourism, particularly in the summer months when it can coincide with lower water supplies, can place a strain on water resources and therefore have implications for water resources management; and
- The future for tourism is uncertain; levels could go up or down.

Proposed SEA scope

Although the majority of recreation areas are outside of waterbodies owned by Affinity Water, the dWRMP2019 options could still impact on tourism and the use of recreation areas either directly or indirectly. Changes in hydrology through the selection of certain options may affect water tables and flows (e.g. to the River Lee). It is therefore proposed that for this SEA, the effects on tourism and recreation should be assessed.

Table 2.2 presents the SEA objective and appraisal questions that will be used for the assessment in relation to this topic.

Table 2.2. SEA Framework of objectives and assessment questions:

SEA objective (will the DWRMP2019...?)	Assessment questions (would the options / programme)	Link to key issue
Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	Result in increased water-based recreational opportunities or new tourist attractions?	There are a number of SASPs and tourism hotspots dependent on the hydrology of the Affinity Water Operating Area.
	Alter water levels that affect water-based recreation assets?	
	Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	The wider area has many rights of way on other linear infrastructure to access recreation which can be disturbed through construction impacts.

Material Assets

Introduction

This section sets out the policy context and the environmental baseline with respect to material assets and waste. It is important to note that material assets and waste have significant inter-relationships with other topics, in particular, tourism and recreation, air quality, and climate change mitigation.

The term ‘material asset’ is not defined in the SEA Directive or Regulations. However, for the purpose of this SEA material assets are defined as:

“it ... includes the impacts to people from disruption to strategic infrastructure such as major roads, rail, ports and airports...” and “Material assets also include potential impacts associated with raw materials and waste generation.”¹⁴

Policy context

The section below includes some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** ‘Policy, plan and programme review’.

Table 3.1. Key messages from the review of the policies, plans and programmes

Document title	Key message												
Waste and Emissions Trading Act 2003	Under the Waste and Emissions Trading Act 2003 ¹⁵ , councils responsible for the disposal and collection of waste have a duty to develop a strategy which outlines how they manage municipal waste. The aim of the strategy is to change the way waste is managed, minimise landfill and drive new initiatives, with the aim of encouraging waste prevention and greater levels of recycling and composting.												
Defra (2011) Government Review of Waste Policy in England 2011	<p>The review was guided by the “waste hierarchy” – this ranks waste management options according to what is best for the environment – see below:</p> <table border="0" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Stages</th> <th style="text-align: left;">Include</th> </tr> </thead> <tbody> <tr> <td>Prevention</td> <td>Using less material in design and manufacture. Keeping products for longer; re use. Using less hazardous materials</td> </tr> <tr> <td>Preparing for re-use</td> <td>Checking, cleaning, repairing, refurbishing, whole items or spare parts</td> </tr> <tr> <td>Recycling</td> <td>Turning waste into a new substance or product. Includes composting if it meets quality protocols</td> </tr> <tr> <td>Other recovery</td> <td>Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste; some backfilling</td> </tr> <tr> <td>Disposal</td> <td>Landfill and incineration without energy recovery</td> </tr> </tbody> </table>	Stages	Include	Prevention	Using less material in design and manufacture. Keeping products for longer; re use. Using less hazardous materials	Preparing for re-use	Checking, cleaning, repairing, refurbishing, whole items or spare parts	Recycling	Turning waste into a new substance or product. Includes composting if it meets quality protocols	Other recovery	Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste; some backfilling	Disposal	Landfill and incineration without energy recovery
Stages	Include												
Prevention	Using less material in design and manufacture. Keeping products for longer; re use. Using less hazardous materials												
Preparing for re-use	Checking, cleaning, repairing, refurbishing, whole items or spare parts												
Recycling	Turning waste into a new substance or product. Includes composting if it meets quality protocols												
Other recovery	Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste; some backfilling												
Disposal	Landfill and incineration without energy recovery												
HM Treasury (2015) Fixing the Foundations: creating a more prosperous nation.	<p>This report emphasised productivity through:</p> <ul style="list-style-type: none"> • “Encouraging long term investment in economic capital, including infrastructure, skills and knowledge; and • Promoting a dynamic economy that encourages innovation and helps resources flow to their most productive use. A fifteen point plan for productivity is provided.” • The document sets out a 15 part framework for raising productivity, including the use of reliable and low carbon energy 												

¹⁴ Jacobs U.K. Limited (2014) Final Water Resources Management Plan: Strategic Environmental Assessment Environmental Report.

¹⁵ [online] available at: <http://www.legislation.gov.uk/ukpga/2003/33/contents> Accessed September 2016

Document title	Key message
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Source: Annex A

Baseline review

In England, the latest statistical release from Defra (2016) concludes that from 2004 to 2013, Raw Material Consumption (RMC) (excluding fossil fuels) decreased from 547 million tonnes to 410 million tonnes; the part of an ongoing reduction in RMC across the UK since 2004.¹⁶ In terms of waste produced, municipal waste generation and storage is loosely linked the dWRMP2019 in that there are potential pathways of pollutants from landfill to water supplies.

It is assumed that all municipal waste is collected and disposed of in an appropriate manner and the dWRMP2019 would have no impact on either its generation or disposal. In considering waste generated by Affinity Water (and other water companies), a proxy measurement is the level of commercial and industrial waste generated in England. The use of national level data will not be as accurate as that for the region or Operating Area; they can however indicate broad trends in waste generation. The latest data for construction and industrial waste in England indicate that in 2012, 39 million tonnes were generated.

Central region

In 2015 Heathrow had nearly 75 million passengers¹⁷ passing through the airport. This was an increase of about 9% compared to the baseline of the WRMP2014. Luton and Stansted airports had about 12 million and 23 million passengers respectively. Heathrow airport has recently been expanded to provide a further terminal (Terminal 5) and Stansted Airport has made a planning application for a second runway (see **Vol 2 Figure 3.1**). There are also a number of hospitals and industrial facilities in the Central region (e.g. Luton and Dunstable Hospital, New QEII Hospital, Princess Alexandra Hospital, and GlaxoSmithKline). All these facilities will need a secure supply of water.

There are a number of land based transport infrastructure links in the Central region e.g. the M11, M1, A1 (M), M4 and M3 and main rail routes to Bristol and Birmingham and to and from London. There is also Crossrail (due December 2018); and the proposed alignment for the High Speed Two (HS2) Phase One between London and the West Midlands.

Jacobs (2014)¹⁸ indicated that Affinity Water Central generated an estimated 73,963 tonnes of excavated waste material in 2010/11 from maintenance works of which 68% was reused or recycled with the rest sent to landfill.

Southeast region

Economic activity and infrastructure associated with the ports of Dover and Folkestone and the nuclear power station at Dungeness are some of the key factors relating to material assets in the Southeast region (see **Vol 2 Figure 3.2**). The Port of Dover is Europe's busiest ferry port; in 2015 about 13.19 million passengers used the port.¹⁹ This number follows a general decreasing trend since

¹⁶ Defra (2016) Digest of waste and resource statistics [online] available at: <https://www.gov.uk/government/statistics/digest-of-waste-and-resource-statistics-2016-edition>. Accessed September 2016.

¹⁷ UK Civil Aviation Authority (2016) Air Passengers by Type and Nationality of Operator 2015 [online] @ https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Airport_stats/Airport_data_2015/Table_08_Air_Passengers_by_Type_and_Nat_of_Operator_2015.pdf. Accessed September 2016.

¹⁸ Jacobs U.K. Limited (2014) Final Water Resources Management Plan: Strategic Environmental Assessment Environmental Report. Accessed September 2016.

¹⁹ Port of Dover (2015) Annual Report & Accounts [online] @ http://www.doverport.co.uk/downloads/DHB_Annual_Report%20and%20Accounts%202015_WEB.pdf Accessed Sept 2016

a peak of 14.49 million passengers in 2007. In 2015 2.53 million commercial vehicles used the port, an increase from 2.36 million in 2007. The port had an annual turnover of £59.8 million in 2015.²⁰

The Channel Tunnel is located in Folkestone and links the town with Calais, France. About 10 million passengers used the Eurostar to cross the English Channel in 2015.²¹ These ports and terminals are a key component of the local economy.

HS1 connects St Pancras in London with the Channel Tunnel and connects with the international high-speed routes between London, Paris, and Brussels. The HS1 connection to Ashford and the M20 provide connections from the Southeast region to the rest of the UK. Lydd airport is located approximately one mile north east of the town of Lydd and offers regular flights to Le Touquet Airport in northern France.

Hospitals in the Southeast region (e.g. Buckland Hospital in Dover and Royal Victoria Hospital in Folkestone) are significant users of water (and sensitive to changes in water chemistry). Dungeness nuclear power station employs over 700 people to operate Dungeness B and decommission Dungeness A (via Magnox);²² the reactor represents an important centre of local demand.

Jacobs²³ reported that the:

“South east region generated an estimated 12,641 tonnes of excavated waste material in 2010/11 from maintenance works of which 69% was reused or recycled with the rest sent to landfill.”

Future environment without the dWRMP2019

The Central and Southeast regions both have important assets that require a consistent and high-quality supply of water. Furthermore, there is a range of assets that could constrain or be affected by construction and maintenance of options (e.g. through construction of HS2).

Increases in air travel are due to be focused in the Southeast region with *“more than half of the total UK travel demand... forecast for 2030...for airports in the South East of England.”*²⁴

²⁰ Port of Dover (2015) Annual Report & Accounts [online] @ http://www.doverport.co.uk/downloads/DHB_Annual_Report%20and%20Accounts%202015_WEB.pdf Accessed Sept 2016

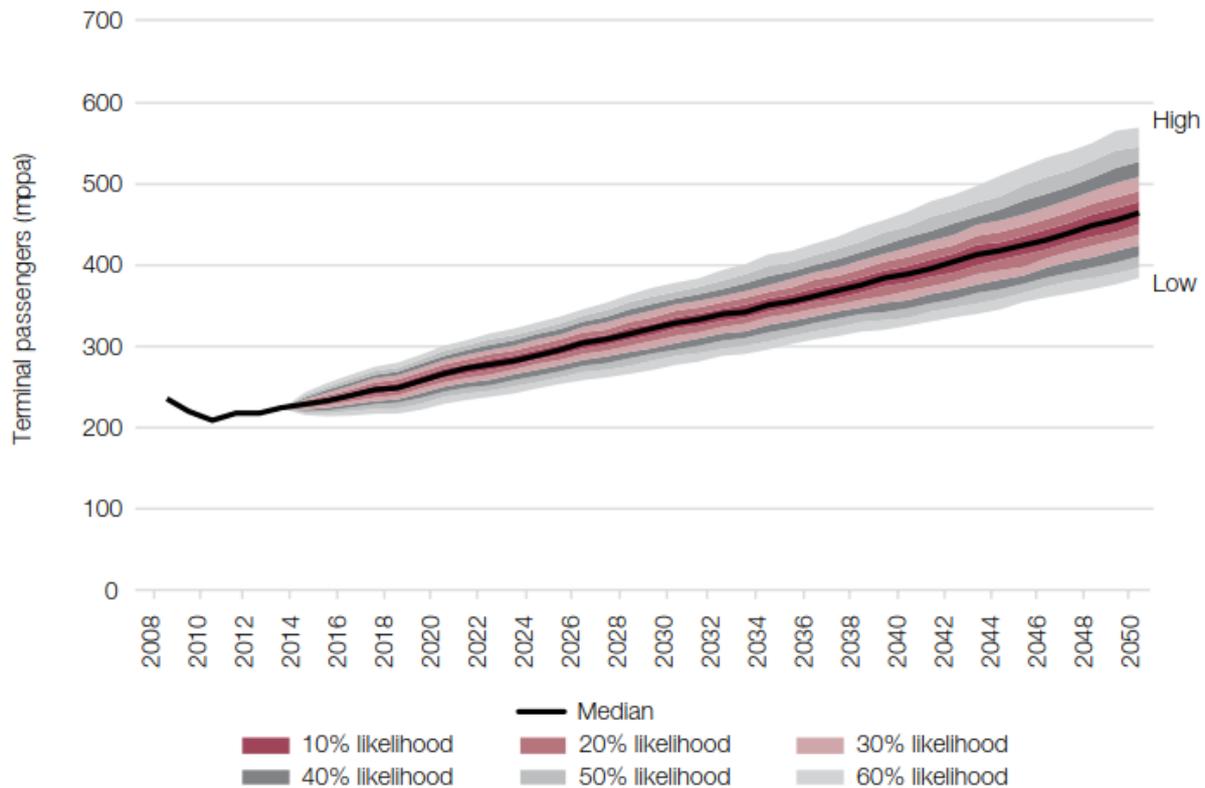
²¹ Eurotunnel Group (2015) Traffic volumes for the past 10 years [online] @ <http://www.eurotunnelgroup.com/uk/eurotunnel-group/operations/traffic-figures/>. Accessed September 2016

²² See: <https://www.edfenergy.com/energy/power-stations/dungeness-b>

²³ Jacobs U.K. Limited (2014) Final Water Resources Management Plan: Strategic Environmental Assessment Environmental Report.

²⁴ DfT (2003) The Future of Air Transport [online] @

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/272086/6046.pdf. Accessed September 2016

Figure 3.3. Unconstrained national air passenger forecasts, carbon-traded, 2008-2050²⁵

As **Figure 3.3** illustrates, up to 2050 there is likely to be a significant increase in passengers in the UK (over double). The government has confirmed its support for airport expansion in the South East at Heathrow.

Nationally there appears to be a reduction in waste generated and waste being disposed by landfill. It is assumed that waste reductions will continue and that these will be reflected in Affinity Waters' operations.

Key issues

- Both the Central and Southeast regions have significant infrastructure that needs a consistent water supply; and
- The ongoing infrastructure developments of HS2 and Crossrail (and expansion at Heathrow) have the potential to disrupt water supply operations and generate increases in demand.

Proposed SEA scope

The delivery of supply options is likely to require some level of construction waste and supply disruption. As key infrastructure, e.g. Heathrow Airport, expands there will be a corresponding increase in water demand. The dWRMP2019 will need to accommodate this expansion as well as ensuring a resilient supply. It is therefore proposed that for this SEA, the effects on construction and industrial waste, and infrastructure should be assessed.

Generation of municipal waste and its disposal will not be subject to assessment as it is not considered that this falls within the geographic scope or objectives of the dWRMP2019.

Table 3.2 presents the SEA objective and appraisal questions that will be used for the assessment in relation to this topic.

²⁵ Airports Commission (2015) Airports Commission: Final Report [online] @ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/440316/airports-commission-final-report.pdf. Accessed September 2016.

Table 3.2. SEA Framework of objectives and assessment questions:

SEA objective (will the DWRMP2019...?)	Assessment questions (would the options / programme)	Link to key issue
Maintain key infrastructure in support of the local economy?	Impact on strategic transport infrastructure such as airports, major roads and railway lines?	The ongoing infrastructure developments of HS2 and Crossrail (and expansion at Heathrow) have the potential to disrupt water supply operations and generate increases in demand.
	Impact on critical services and industries e.g. energy productions and hospitals?	Both the Central and Southeast regions have significant infrastructure that needs a consistent water supply;
Reduce material consumption and the generation of waste?	Require significant new construction or demolition of existing assets?	N/A
	Result in higher levels of reuse of waste?	

Biodiversity, Flora and Fauna

A complex relationship exists between water and nature conservation. There are significant inter-relationships between this topic and others, in particular landscape and cultural heritage.

Policy context

This section sets out some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** 'Policy, plan and programme review'

Table 4.1. Key messages from the review of the policies, plans and programmes

Document title	Key message
EU Biodiversity Strategy	Adopted in May 2011, the EU Biodiversity Strategy was established a new Europe-wide target to “halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020”.
The National Planning Policy Framework (NPPF)	Key messages from the NPPF set out the Plan should: Contribute to the government’s commitment to halt the overall decline in biodiversity by minimising impacts and achieving net gains in biodiversity wherever possible; Promote the ‘preservation, restoration and recreation of priority habitats, ecological networks’ and the ‘protection and recovery of priority species’; Plan for biodiversity at a landscape-scale across local authority boundaries; Take account of the effects of climate change in the long term. Adopt proactive strategies to adaptation and manage risks through adaptation measures; and. Protect high quality open space or mitigate their loss (unless a lack of need is established).
Natural Environment White Paper	The ‘Natural Environment White Paper’ (NEWP) sets out the importance of a healthy, functioning natural environment to sustained economic growth, prospering communities and personal wellbeing. It includes commitments to: Halt biodiversity loss, support functioning ecosystems and establish coherent ecological networks by 2020; Establish a new voluntary approach to biodiversity offsetting to be tested in pilot areas; Address barriers to using green infrastructure to promote sustainable growth; and Taking account of all the economic and non-economic benefits derived from natural resources (such as food, timber and water) and functioning natural systems (such as healthy, fertile soils; clean water and air; and a regulated climate) to allow an ‘ecosystems approach’ to be taken in order to manage ecosystems in a more integrated fashion.
The UK post-2010 Biodiversity Framework	The UK Biodiversity Action Plan (UK BAP) was published in 1994 and was the UK government’s response to the Convention on Biological Diversity. The UK BAP described the biological resources of the UK and provided detailed plans for conservation of these resources. Action plans for the most threatened species and habitats were set out to aid recovery, and national reports, produced every three-to five-years, showed how the UK BAP was contributing to the UK’s progress towards the significant reduction of biodiversity loss. The ‘UK Post-2010 Biodiversity Framework’, published in July 2012 ²⁶ , succeeds the UK BAP and ‘Conserving Biodiversity – the UK Approach’, and is the result of a change in strategic thinking following the publication of the Convention on Biological Diversity’s (CBD) ‘Strategic Plan for Biodiversity 2011–2020’. ²⁷
The Habitats Directive	the main aim of the Habitats Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance. In applying these measures Member States are required to take account of economic, social and cultural requirements, as well as regional and

²⁶ JNCC (2012) The UK Post-2010 Biodiversity Framework [online] @ <http://jncc.defra.gov.uk/page-6189>. Accessed September 2016

²⁷ CBD (2010) The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets [online] @ <https://www.cbd.int/decision/cop/?id=12268>. Accessed September 2016.

	local characteristics.
The Wildlife and Countryside Act 1981	The Wildlife and Countryside Act 1981 consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the conservation of wild birds (Birds Directive) in Great Britain (NB Council Directive 79/409/EEC has now been replaced by Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version)).
NERC act	Section 41 of the NERC Act highlights the important habitats and species that have declined in coverage over recent decades and are now considered to be threatened

Source: Annex A

Baseline review

Sites of biodiversity value are generally designated at three levels, international, national and local. Internationally important sites are those designated under the Habitat, and Birds Directive, and the Ramsar Convention. These are collectively known as European sites and include Special Areas of Conservation, Special Protection Areas and Ramsar sites. At a national level, Sites of Special Scientific Interest (SSSI) are designated under the National Parks and Access to the Countryside Act 1949, amended in the Environment Act 1995. At a local level Sites of Importance for Nature Conservation (SINCs) can be designated by Local Planning Authority, and thus are granted protection through the development plan.

Whilst 'designated' biodiversity sites are offered a degree of protection from development and other activities through European and domestic legislation there are still a significant amount of sites designated 'below' European and UK legislation that have biodiversity value locally and cumulatively. The array of designated and non-designated sites forms a network of sites that can be mutually supportive and inter-connected.

Section 41 of the Natural Environment and Rural Communities (NERC) Act highlights the important habitats and species that have declined in coverage over recent decades and are now considered to be threatened. Some of the protected species and habitats within the Study Area (such as wetlands and calcareous grassland) are identified in Section 41 of the NERC Act.

Ancient woodlands are defined as areas "*that have been wooded continuously since at least 1600 AD*"²⁸. These areas are generally protected at a local level through planning policy. There are areas of Ancient Woodland throughout both regions.

Central region

A 10 km buffer around the Study Area was used to capture all the designated sites that may be affected by the dWRMP2019. Within this wider buffer, the Central region contains 535 SSSI. Within the Operating Area itself, there are 213. The condition of water dependent SSSIs has been updated to reflect any changes in condition since the last review – for further information see **Annex B** of this report as well as in **Table 4.2 and Vol 2 Figure 4.1**. Where the geographical extent of SSSI's is analogous to that of RAMSARs, SPAs, and SACs the SSSI condition is being used as a site-specific proxy for nationally recorded statistics on Conservation Status of these European designated sites.

The main habitat types in the Central Region include:

- Woodlands – located throughout the Chilterns, Thames Valley, Thames Basin Heaths and Northern Thames Basin;
- Enclosed farmland - located throughout the Chilterns, Thames Valley, Thames Basin Heaths and Northern Thames Basin;

²⁸ DCLG (2012) National Planning Policy Framework [online] @ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf. Accessed November 2016

- Semi-natural grasslands - located throughout the Chilterns, Thames Valley, Thames Basin Heaths and Northern Thames Basin;
- Wetlands and floodplains - located throughout the Thames Valley, and Northern Thames Basin; and
- Heathland - located throughout the Northern Thames Basin.

Some of the priority BAP habitats identified by Affinity Water within the Central region include:

- Ancient woodland: isolated areas across Central region which include larger sections which are part of the Watling Chase and Thames Chase Community Forests;
- Wetland habitats including lowland grazing marsh and reedbeds: these are located in the Upper Lee Valley and Thames Basin and also in isolated areas around Watford and Staines;
- Calcareous grassland and heath: including the Chilterns AONB;
- Heath and acid grassland: Thames Basin Heath SPA;
- Arable cereal margins: These are concentrated in the north and east of the region;
- Chalk streams; and
- Reedbeds.

Jacobs²⁹ identified that there are also non-native species present within the region. These species include Chinese mitten crabs, Japanese knotweed, mink, signal crayfish and floating pennywort. Affinity Water has also identified giant hogweed and himalayan balsam as non-native species in the Central region. Non-native species can become invasive which may cause damage to the environment, economy and human health. This may have significant negative knock on effects for native species and the wider ecosystem in such areas. A key issue for the SEA will be to determine to what extent options (particularly those involving long distance water transfers) influence the spread of non-native species.

Fish migration in the Study Area can be impeded by weirs and sluices found on the Lower Thames. Affinity Water has installed fish screens and eel passes to mitigate impacts on these receptors (e.g. fish screens at river intakes to prevent fish entrainment). Additionally, Affinity Water has also undertaken works on two lakes which are designated as Heavily Modified Water Bodies so that they achieve Good Ecological Potential by 2027. Further replacement fish screens, to meet the Eels Regulations, have also been installed at ARDL.³⁰

Table 4.2. Internationally and nationally designated sites in the Central region

Site Name	Grid Reference	Primary habitat & species	Water related threats to 'site condition'
Special Protection Areas			
Lee Valley (also designated as a Ramsar site)	TQ351886	Inland water bodies (both standing and running water) bogs. Marshes and wet grassland. Populations of Gadwall, Shoveler and Bittern. Also, the nationally scarce plant species whorled water-milfoil <i>Myriophyllum verticillatum</i> and the rare or vulnerable invertebrate <i>Micronecta minutissima</i> (a water-boatman). These are both Ramsar species.	Hypernutrification (particularly phosphorus) leading to eutrophication. Over-extraction of surface water, particularly during periods of drought.
South West London Water	TQ024745	Inland water bodies (standing and running water), bogs, marshes	The future decommissioning of reservoirs and any associated

²⁹ Jacobs U.K. Limited (2014) Final Water Resources Management Plan: Strategic Environmental Assessment Environmental Report.

³⁰ Affinity Water (2014) Final Water Resources Management Plan, 2015-2020.

Site Name	Grid Reference	Primary habitat & species	Water related threats to 'site condition'
Bodies (also designated as a Ramsar site)		and wet grassland. Also designated as a Ramsar site due to supporting internationally important numbers of wintering birds including Northern Shoveler and Gadwall.	maintenance works may result in a requirement for winter draw down of reservoirs.
Thames Basin Heaths	SU881641	Heath and scrub including mixed woodland. Designated for populations of breeding Nightjar, Woodlark and Dartford warbler.	None identified.
Special Areas of Conservation			
Epping Forest	TQ410981	Beech forests with large numbers of veteran trees. The forest is rich in both fungi and dead-wood invertebrates including stag beetles.	None identified.
Thursley, Ash, Pirbright and Chobham	SU976654	The habitats are comprised of wet heath, dry heath and depressions on peat substrates. These contain several rare plants and animals, which include sand lizard and smooth snake.	Lowering of water tables as a result of water abstraction or other reasons which could cause loss or damage to wet heath and mire communities.
Windsor Forest and Great Park	SU953715	These are oak woodlands which contain the largest number of veteran oaks in Britain. They also hold a number of invertebrate species including the violet click beetle and rich fungal assemblages.	None identified.
National Nature Reserves			
Hatfield Forest	TL538202	This contains woodland and wood pastures which support rare plants. The old pollarded trees support lichens, invertebrates, and mistletoe.	None identified.
Broxbourne Woods	TL321057	These woods contain areas identified as Ancient woodland which supports species including badgers, weasels, grass snakes and Muntjac deer. Twenty-seven species of butterfly have been recorded at the site.	None identified.
Chobham Common	SU981644	This habitat is comprised of Lowland heath home to more than 300 plant species. It also includes rare bird species including the Dartford warbler, hobby and nightjar.	None identified.
Ruislip Woods	TQ093891	Form an extensive example of ancient semi-natural woodland, including some of the largest unbroken blocks that remain in Greater London. A diverse range of oak and hornbeam woodland types occur.	None identified.
Hales Wood	TL571403	These are coppice-with-standards woods of the wet Ash-Maple	None identified.

Site Name	Grid Reference	Primary habitat & species	Water related threats to 'site condition'
		Woodland type. They are under active coppice management and support a rich assemblage of plants and animals, including two nationally uncommon plant species.	

Source: Adapted from Jacobs 2014

Southeast region

A 10 km buffer around the Study Area was used to capture the designated sites downstream of the Operating Area that may be affected by the dWRMP2019. Within this wider buffer, the Southeast region contains 101 SSSIs. Within the Operating Area itself, there are 52. The condition of water dependent SSSIs has been updated to reflect any changes in condition since the last review - see **Annex B** of this report as well as in **Table 4.3 and Vol 2 Figure 4.2**.

The main habitat types in the Southeast region include:

- Coastal margin – in the Romney Marshes, and North Downs;
- Enclosed farmland - in the Romney Marshes, Wealden Greensands, and North Downs;
- Semi-natural grasslands - in the Romney Marshes, Wealden Greensands, and North Downs;
- Wetlands and floodplains - in the Romney Marshes;
- Woodlands - in the Wealden Greensands, and North Downs; and
- Chalk rivers and streams.

Jacobs³¹ identified that there are also non-native species present within the region. These species include mink, marsh frogs, Himalayan balsam, Canadian pondweed, Australian swamp stonecrop, Japanese knotweed, zebra mussel, giant hogweed, water fern, Turkish crayfish, pacific oyster, and leathery sea squirt. The dWRMP2019 has the potential to enable the translocation of such species through long distance water transfers. This may have significant negative knock on effects for native species and the wider ecosystem in such areas. A key issue for the SEA will be to determine to what extent options (particularly those involving long distance water transfers) influence the spread of non-native species.

The Thames Estuary supports over 120 different fish species, which are important both ecologically and economically. The River Dour is also noted to have an important population of Brown Trout within the context of Kent rivers. The Zoological Society of London noted that: *“Since being declared “biologically dead” in the 1950’s, the environment has improved significantly and the Thames Estuary is now one of the world’s most unpolluted metropolitan tideways.”*³²

There are also two Marine Conservation Zones (MCZs) in the region. MCZs are in place to protect a range of nationally important marine wildlife, habitats, geology and geomorphology, and can be designated anywhere in English and Welsh territorial and UK offshore waters. They were brought into being under the Marine and Coastal Access Act 2009.

The two MCZs present in the South East Region, are:

The **Dover to Deal MCZ**: which covers an area of 9.91 km² between Dover and Deal, and which contains a range of protected features including –

³¹ Jacobs U.K. Limited (2014) Final Water Resources Management Plan: Strategic Environmental Assessment Environmental Report.

³² Available online at: <https://www.zsl.org/conservation/regions/uk-europe/monitoring-thames-fish> (Accessed September 2016)

- Low energy intertidal rock
- Moderate energy intertidal rock
- High energy intertidal rock
- Intertidal coarse sediment
- Intertidal sand and muddy sand
- Intertidal underboulder communities
- Littoral chalk communities
- Moderate energy infralittoral rock
- Subtidal chalk
- Subtidal mixed sediments
- Subtidal sand
- Native oyster

The **Dover to Folkestone MCZ**: which covers an area of 19.53km², and which contains a range of protected features including –

- Low energy intertidal rock
- Moderate energy intertidal rock
- High energy intertidal rock
- Intertidal coarse sediment
- Intertidal sand and muddy sand
- Intertidal underboulder communities
- Littoral chalk communities
- Moderate energy infralittoral rock
- Subtidal coarse sediment
- Subtidal mixed sediments
- Subtidal sand
- Subtidal mud
- Native oyster
- Folkestone Warren

Some options within the South East Region have the potential to impact negatively on the marine environment, and consequently there may be a need to consider impacts on BAP Priority Species present within the marine environment. Marine species and habitats were assessed separately from terrestrial and freshwater habitats and species. The marine UK BAP criteria were developed from the Review of Marine Nature Conservation (RMNC) and the Irish Sea Pilot (ISP). There are a total of 25 marine BAP Priority habitats³³, and 87 marine BAP Priority Species.³⁴

Table 4.3. Internationally and nationally designated sites in the Southeast region

Site Name	National Grid Reference	Primary habitat & species	Threats to site condition related to water
Special Protection Areas			
Dungeness, Romney Marsh and Rye Bay (also designated as a Ramsar site)	TR077261	Includes the largest and most diverse area of shingle beach in Britain, nationally important saline lagoons, natural freshwater pits and basin fens. Sheltered saltmarsh and mudflat intertidal habitats, and areas of saltmarsh, extensive grazing marshes and reedbeds. As a whole, Dungeness, Romney Marsh and Rye Bay are important for breeding and wintering waterbirds, birds of prey, passage warblers and breeding seabirds.	None identified.
Special Areas of Conservation			
Dungeness	TR044181	A large cusped shingle foreland which supports breeding terns	Draw down of water table could create adverse conditions for

³³ Joint Nature Conservation Committee (2016) UK BAP list of Priority Habitats [online] available at: <http://jncc.defra.gov.uk/page-5706>

³⁴ Joint Nature Conservation Committee (2016) UK BAP list of Priority Species [online] available at: <http://jncc.defra.gov.uk/page-5167>

Site Name	National Grid Reference	Primary habitat & species	Threats to site condition related to water
		and gulls. The Open Pits contain a natural succession of wetlands from species-rich fen through to willow carr.	great crested newts.
Folkestone to Etchinghill Escarpment	TR181387	This site consists of extensive calcareous grasslands, together with smaller areas of short-turf grassland. The site contains an important assemblage of rare and scarce species, including various orchid species.	None identified.
Parkgate Down	TR168459	Consists largely of National Vegetation Classification (NVC) type CG4 Brachypodium pinnatum grassland. The site contains an assemblage of orchids including the nationally rare monkey orchid and late spider together with the nationally scarce musk and lady orchid.	None identified.
Lydden Temple Ewell	TR276453	Lowland chalk down-land comprised of semi-natural dry grassland and scrubland. It hosts the priority habitat type "orchid rich sites"	None identified.
Dover to Kingsdown Cliffs	TR374451	Vegetated sea cliffs which support a full zonation of maritime cliff communities found on chalk substrates, reflecting different levels of exposure to wind and salt spray.	This cliff is subject to natural coastal erosion. The grassland is being squeezed between the eroding cliff and arable land behind.
National Nature Reserves			
Dungeness	TR044181	A large cusped shingle foreland which supports breeding terns and gulls. The Open Pits contain a natural succession of wetlands from species-rich fen through to willow carr.	None identified.
Lydden Temple Ewell	TR276453	Lowland chalk down-land comprised of semi-natural dry grassland and scrubland. It hosts the priority habitat type "orchid rich sites"	None identified.

Source: Adapted from Jacobs 2014

Future environment without the dWRMP2019

An analysis of water dependent SSSIs (see **Annex B**) indicates that the condition of some SSSIs have changed since PR14. Of concern are the four that have recorded a declined in condition status (Fray's Farm Meadows, Rye Meads, Staines Moor and Dungeness, Romney Marsh and Rye Bay).

Future anthropogenic activities and increased population growth in the future will have a detrimental impact to protected sites and wider biodiversity features in the future. This is linked to water demand, and supply, and will therefore need to be considered as part of the SEA with regards to the

dWRMP2019. Furthermore the effects of climate change may have an effect on water dependant species' ability to adapt to a change in water levels and / or quality.

Water supply in the Study Area can affect the condition of designated sites and as such the dWRMP2019 has a role to play in ensuring a favourable environment for SSSI conditions to improve. Water-dependant habitats (such as reed beds and wet woodland) are particularly susceptible to changes in water quality and quantity. These habitats will be vulnerable to changes in the water supply in the short and long-term (e.g. the impacts of climate change).

The environmental quality of water bodies should improve in the future, as requirements of the WFD are implemented and sustainability reductions take effect. Additionally, new protected areas are likely to be designated in the future, for instance, a third tranche of MCZs are currently planned to be designated in 2018. This should result in significant positive benefits for the protected species and areas. Also, through the National Environment Programme (NEP), Affinity Water is putting in place schemes for improving biodiversity and catchment management (relating to biodiversity drivers) which should have a positive effect on water quality and supply.

Key comments from previous consultation responses

During scoping, Natural England highlighted that a number of environmental designations including SPA and Ramsar sites should be updated to reflect new designations and that a number of amendments to a number of Acts and Regulations relating to biodiversity should be made. Additionally, Natural England sought that the objective for biodiversity, flora and fauna more explicitly stated a need to conserve and enhance biodiversity, including designated sites and habitats and species of principal importance.

In response to the 2014 SEA Environmental Report, Natural England identified omissions in the SEA in regard to the consideration of invasive species, geological or geomorphological SSSIs, opportunities to enhance landscape character and the issue as to whether to consider air quality and noise impacts. These comments have been addressed in this report.

Key issues

- A number of non-native species are found in the Study Area and there is potential for the dWRMP2019 to contribute to the restoration of habitats affected by the presence of these non-native species;
- Rivers and lakes within the Southeast region are vulnerable to low flows and poor water quality;
- The Thames Estuary supports over 120 different fish species, and the River Dour is noted to have an important population of Brown Trout within the context of Kent rivers. These are important both ecologically and economically;
- A number of SSSIs in the Study Area have deteriorated in condition since WRMP 2014; and
- There is the potential for further habitat fragmentation and loss through development activities and future population growth in the area.

Proposed SEA scope

Options / programmes can directly or indirectly impact on both terrestrial or aquatic habitats and species. It is therefore proposed that for this SEA, the effects on biodiversity, flora and fauna should be assessed. Specifically, the SEA will focus on the impact to nationally and internationally designated sites; non-designated sites will not be a focus of this assessment.

Table 4.4 presents the SEA objective and appraisal questions that will be used for the assessment in relation to this topic.

Table 4.4. SEA Framework of objectives and assessment questions:

SEA objective (will the DWRMP2019...?)	Assessment questions (would the options / programme)	Link to key issue
Protect and enhance biodiversity including designated and other important habitats and species?	Impact on European sites?	Addressed through the HRA process.
	Lead to the loss or degradation of priority habitats or species or lead to the creation of new priority habitats?	There is the potential for further habitat fragmentation and loss through development activities.
	Impact on non-native species?	A number of non-native species are found in the Study Area.
	Affect the condition of SSSIs, particularly those that have a trend of declining condition?	A number of SSSIs in the Study Area have deteriorated in condition since WRMP 2014.
	Provide opportunities for biodiversity enhancement?	In response to EA feedback

Landscape, Townscape and Visual Amenity

Landscape quality, including the quality of the cultural or historic landscape, is important to the public's enjoyment of the countryside. As such this chapter has cross-cutting relevance to other SEA topics including biodiversity, flora and fauna, and tourism and recreation access.

Policy context

This section sets out some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** 'Policy, plan and programme review'.

Table 5.1. Key messages from the review the policies, plans and programmes

Document title	Key message
European Landscape Convention	The European Landscape Convention of the Council of Europe, (the 'Florence Convention') promotes the protection, management and planning of European landscapes and organises European co-operation on landscape issues. The Florence Convention introduced a Europe-wide concept centring on the quality of landscape protection, management and planning and covering the entire territory, not just outstanding landscapes.
The National Planning Policy Framework (NPPF)	Key messages from NPPF include that the Plan should: <ul style="list-style-type: none"> • Conserve and enhance valued landscapes, giving particular weight to those identified as being of national importance; • Recognise heritage assets as an 'irreplaceable resource' that should be conserved in a 'manner appropriate to their significance', taking account of 'the wider social, cultural, economic and environmental benefits' of conservation, whilst also recognising the positive contribution new development can make to local character and distinctiveness; and • Consider the effects of climate change in the long-term, including in terms of landscape. Adopt 'proactive strategies' to adaptation and manage risks through adaptation measures including well planned green infrastructure.
Area of Outstanding Natural Beauty (AONB) Management Plans	These are landscapes which distinctive character and natural beauty are so precious that it is in the nation's interest to safeguard them. AONBs are designated in recognition of their national importance and to ensure that their character and qualities are protected for all to enjoy. The primary purpose of AONB designation is: <ul style="list-style-type: none"> • To conserve and enhance the natural beauty of the landscape. • Two secondary aims complement the purpose: <ul style="list-style-type: none"> – To meet the need for quiet enjoyment of the countryside; and – To have regard for the interests of those who live and work there.
Heritage Coasts ³⁵	Heritage Coasts are 'defined' rather than designated. As such, there is no statutory designation process like that associated with national parks and AONBs. They were established to conserve the best stretches of undeveloped coast in England. A Heritage Coast is defined by agreement between the relevant maritime local authorities and Natural England. The national policy framework and objectives for Heritage Coasts were developed by the Countryside Commission, a predecessor of Natural England, and ratified by the government. Heritage Coasts were established to conserve, protect and enhance: <ul style="list-style-type: none"> • the natural beauty of the coastline; • their terrestrial, coastal and marine flora and fauna; • their heritage features; • encourage and help the public to enjoy, understand and appreciate these areas; • maintain and improve the health of inshore waters affecting Heritage Coasts and their beaches through appropriate environmental management measures; and • take account of the needs of agriculture, forestry and fishing and the economic and social needs of the small communities on these coasts.

Source: Annex A

³⁵ See: <https://www.gov.uk/government/publications/heritage-coasts-protecting-undeveloped-coast/heritage-coasts-definition-purpose-and-natural-englands-role>

Document title	Key message
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Baseline review

Central region

The Central Region contains two AONBs (see Vol 2 Figure 5.1):

- **The Chilterns AONB:** The Chilterns AONB lies to the north west of London covering an area of 833 km²; “It extends over 74 km from south west to northeast and c.18 km by south east to north west, stretching in a band from western Oxfordshire, across Buckinghamshire into the fringes of Hertfordshire and Bedfordshire.” The Historic Landscape Characterisation Report goes on to define the Chilterns AONB as “...*principally rural in character, the Chilterns lie within the hinterland of Greater London and are fringed by substantial settlements, including Reading, High Wycombe, Marlow, Chesham, Amersham, Aylesbury, Hemel Hempstead, Luton, Dunstable and Hitchin. This surrounding area has been, and continues to be, subject to considerable development pressure.*”³⁶[emphasis added]
- **The Surrey Hills AONB:** the Surrey Hills AONB was one of the first landscapes to be designated an AONB (designated in 1958). 40 % of the AONB is covered by woodland; 14% of this woodland is designated as Ancient Woodland. 18% is heath and commons and 1% is chalk grassland. There are 37,000 people living in the AONB whilst 30 million visitor days per year are spent in the AONB. The AONB faces the following key pressures and threats:
 - Housing development;
 - Off road vehicles;
 - Energy (oil, gas, fracking);
 - Loss of local services;
 - Excavation of minerals;
 - Changes in agriculture;
 - Aircraft noise;
 - Climate change;
 - Mountain biking; and
 - Road cycling.³⁷

The government sets out that National Character Areas (NCAs) “*divide England into 159 distinct natural areas. Each is defined by a unique combination of landscape, biodiversity, geodiversity, history, and cultural and economic activity. Their boundaries follow natural lines in the landscape rather than administrative boundaries.*”[Emphasis added].³⁸ There are five NCAs within the Central region:

- **South Suffolk and North Essex Clayland (Area 86):** “*This NCA is made up of undulating countryside, incised by small river valleys flowing east to the North Sea, with sporadic but narrow interfluvial plateaux. This is an area of chalky boulder clay (glacial till) but with more topographical variation than the area to the north.*”³⁹

³⁶ The Chilterns Conservation Board (2009) The Changing Landscape of the Chilterns [online] available at: http://www.chilternsaonb.org/uploads/files/AboutTheChilterns/HistoricEnvironment/The_Changing_Landscape_of_the_Chilterns.pdf.

³⁷ Surrey Hills Conservation Board (2014) Management Plan 2014-2029 [online] available at: <http://www.surreyhills.org/board/management-plan-2014-2019/>.

³⁸ See: <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making>

³⁹ Natural England (2014) NCA Profile: 86 South Suffolk and North Essex Clayland (NE515) [online] @ <http://publications.naturalengland.org.uk/publication/5095677797335040?category=587130>. Accessed September 2016

- **Chilterns (Area 110):** *“Landform is dictated by chalk strata which have been tilted upward to create a north-east to south-west escarpment. The scarp faces north-west across low-lying vales. The dip slope descends down into the London Basin and appears as a plateau behind the crest of the scarp.”*⁴⁰
- **Northern Thames Basin (Area 111):** *“This NCA can be broken down into four sub-character areas: Hertfordshire plateaux and river valleys; Essex wooded hills and ridges; London Clay lowlands; and Essex heathlands. The Hertfordshire plateaux and river valleys area is topographically complex, having many valleys cut into the broad plateau landform which is often obscured by vegetation cover. In places river erosion has created isolated landforms such as the Shenley Ridge. The Essex wooded hills and ridges rise above the London Clay lowlands to an altitude of approximately 100 m AOD. The London Clay lowlands are generally flat and typically gently undulating. Broadly, the Essex heathlands landform is relatively flat with only minor undulations; however, some of the river valleys are steep sided such as the Stour, Colne and Roman.”*⁴¹
- **Thames Basin Lowlands (Area 114):** *“This is an essentially lowland area lying within the London Basin. The land is a gently undulating plain for the most part, rising towards the dip slope of the North Downs to the south and east and to the Thames Basin Heaths in the west.”*⁴²
- **Thames Valley (Area 115):** *“In its northern parts, the landform reflects the rolling hills characteristic of the nearby Chilterns. Here, the Chalk is overlain by clay and gravel, giving rise to a plateau and a series of knolls. The central part of the Thames Valley is dominated by the Thames flood plain, giving way to clay vales further south. There are lakes in the east resulting from mineral workings.”*⁴³

Southeast region

The Southeast region contains one AONB (see **Vol 2 Figure 5.2**):

- **The Kent Downs AONB:** this AONB covers 878 km² from the White Cliffs of Dover to the Surrey Border. It contains one of the South East’s highest points at 250 metres (the Sevenoaks Greensand ridge). There are also three main river catchments which cut through the AONB, draining in a south to north direction. The biggest of these are the Rivers Darent, Medway and Great Stour. The white cliffs of Dover and Folkestone are also located within the AONB and are defined as Heritage Coasts.⁴⁴

There are also three NCAs in the Southeast region:

- **North Downs (Area 119):** *“The backbone of the Downs is a distinctive ridge with a steep south-facing scarp and northern dip slope. The ridge is cut by numerous dry valleys, some containing winterbournes. The Downs end abruptly in the east at the distinctive landmark of the White Cliffs. During the ice ages although not glaciated the area was under the influence of very cold tundra-like conditions at the edge of the ice sheets. Processes of erosion and deposition during this period have contributed significantly to the formation of the present landscape.”*⁴⁵
- **Wealdon Greensand (Area 120):** *“The Wealden Greensand NCA follows the outcrop of Upper and Lower Greensand which curves around the western end of the Wealden anticline in West Sussex, east Hampshire and Surrey and forms a conspicuous ridge running west to east across Surrey and Kent terminating in coastal cliffs at Folkestone Warren. Time and the elements have removed overlying strata to leave the well-defined concentric outcrops that encircle the Low and High Weald. Surface water is a feature across the Greensand with streams and rivers draining off the dip slope. Late Pleistocene landslips, in particular cambering and gullying, are common along*

⁴⁰ Natural England (2013) NCA Profile:110 Chilterns (NE406) [online] @ <http://publications.naturalengland.org.uk/publication/4977697?category=587130>. Accessed September 2016

⁴¹ Natural England (2013) NCA Profile:111 Northern Thames Basin (NE466) [online] @ <http://publications.naturalengland.org.uk/publication/4721112340496384?category=587130>. Accessed September 2016

⁴² Natural England (2014) NCA Profile:114 Thames Basin Lowlands (NE571) [online] @ <http://publications.naturalengland.org.uk/publication/5682232412864512?category=587130>. Accessed September 2016

⁴³ Natural England (2014) NCA Profile:115 Thames Valley (NE379) [online] @ <http://publications.naturalengland.org.uk/publication/3865943?category=587130>. Accessed September 2016

⁴⁴ Kent Downs Conservation Board (2014) Management Plan 2014-2019 [online] available at: http://www.kentdowns.org.uk/uploads/documents/KD_AONB_final_plan_09.09.14.compressed.pdf

⁴⁵ Natural England (2014) NCA Profile:119: North Downs (NE431) [online] @ <http://publications.naturalengland.org.uk/publication/7036466?category=587130>. Accessed September 2016

inland escarpments and parts of the coast. Most notable is the Folkestone Warren land slip, where massive chalk has slipped on underlying Gault Clay. Here twelve major landslips have occurred since 1765, the most notable being in 1915 when the coastal railway line was displaced.”⁴⁶

- **Romney Marshes (Area 123):** *“The geology of the NCA is dominated by coastal deposits and, most importantly, the cusped shingle foreland of Dungeness. The NCA owes its existence to the growth of this feature, first in its role as a barrier beach and later as a cusped foreland, leading to the siltation and subsequent drainage of the shallow bay between Dungeness and the ancient shoreline. Over the centuries the foreland has gradually changed shape under the forces of wind and tide becoming progressively sharper. Today the shingle foreland is composed of several hundred storm beaches, in several groups, which record the location and shape of the foreland at each stage of its formation. Behind the shingle beach alluvial deposits filled the shallow bay, and with subsequent drainage, these have formed the Romney and Walland Marshes, Denge Marsh and East Guldeford and Pett Levels.”⁴⁷*

The Southeast region encompasses the Dover-Folkestone Heritage Coast which was defined in January 1998 and covers a length of 8km with an area of 4km². It lies between Dover and Folkestone and covers the ‘The White Cliffs of Dover’. The Southeast region also contains the South Foreland Heritage Coast which lies to the north east of Dover. It was designated in January 1998 and covers a length of 8km and total area of 6km².

Unlike national parks and AONBs the Heritage Coast designation is non-statutory, and designations can only be made with the agreement of local authorities and landowners. However, the majority of Heritage Coasts fall within statutorily designated landscapes such as national parks and AONBs. In the case of the Dover-Folkestone and South Foreland Heritage Coasts, both fall within the Kent Downs AONB designated area and as such are provided with statutory protection.⁴⁸

Future environment without the dWRMP2019

Drivers for change in the landscape (in both regions) include, but are not limited to:

- **Climate change** - increased evaporation, changing rainfall patterns, sea level rise (in the Southeast region), increased risk of flooding, invasive species, and drought;
- **Development pressure** – a pressure and an opportunity as new development allows for mitigation such as green infrastructure to potentially be delivered. This is likely to be focused in the London commuting belt and driven partly by meeting London’s unmet housing need in the wider south east;
- **Increased recreation** – as a result of population growth; and
- **Water availability** - implementation of the WFD should improve the ecological status or potential of the NCA’s rivers and the quality of groundwater.

In the absence of the dWRMP2019, the implementation of WRMP2014 is likely to have ongoing effects on the landscape. Options proposed for dWRMP2019 that include above ground engineering e.g. bunded reservoirs, pumping stations are likely to have some impact on the landscape, temporary or permanent. This will not necessarily be negative as some options will provide opportunities for landscape enhancement.

Key comments from previous consultation responses

Natural England stated in response to the scoping consultation that: *“It may be helpful to add Kent Downs AONB and Surrey Hills AONB to the consultation body list”*. The relevant AONB management boards will be consulted during the consultation exercise for this assessment. Natural England further noted in the responses to the SEA Environmental Report that there should be greater emphasis on ‘enhancement’ in the SEA objectives.

⁴⁶ Natural England (2013) NCA Profile:120 Wealden Greensand (NE465) [online] @ <http://publications.naturalengland.org.uk/publication/5331490007154688?category=587130>. Accessed September 2016

⁴⁷ Natural England (2013) NCA Profile:123 Romney Marshes (NE499) [online] @ <http://publications.naturalengland.org.uk/publication/5701066775592960?category=587130>. Accessed September 2016

⁴⁸ Natural England (2015) Heritage Coasts: protecting undeveloped coast [online] available at: <https://www.gov.uk/government/publications/heritage-coasts-protecting-undeveloped-coast>

Key issues

- There are a range of designated areas of landscape value in both regions; and
- The landscape in both regions is facing a range of challenges from climate change and other factors.

Proposed SEA scope

The dWRMP2019 supply options have the potential to affect the landscape e.g. bunded reservoirs in areas of flat topography. Given the sensitive nature of local receptors and the potential for impacts, it is proposed that for this SEA, the effects on landscape should be assessed. Specifically, the assessment will focus on the effects on designated landscapes.

Table 5.2 presents the SEA objective and appraisal questions that will be used for the assessment in relation to this topic.

Table 5.2. SEA Framework of objectives and assessment questions

SEA objective (will the DWRMP2019...?)	Assessment questions (would the options / programme)	Link to key issue
Conserve and enhance landscape character and visual amenity?	Impact views from public rights of way, designated landscapes, parks or other valued places?	There are a range of designated areas of landscape value in both regions.
	Provide opportunities for landscape enhancement?	Both regions face development pressures including from London and the development 'spill over' required to meet London's housing need.

Air Quality and Noise

The pollutants of greatest concern to health and biodiversity in the UK are particulate matter (PM) (specifically PM_{2.5} and PM₁₀), nitrogen oxides (NO and NO₂), ammonia and ozone. The transport sector is the dominant source of PM₁₀ and NO₂ emissions in England.⁴⁹ The highest levels of PM₁₀ and NO₂ emissions are seen in large urban areas and on busy roads. Concentrations of PM₁₀ and NO₂ decrease away from the main source of the emission and, as such, concentrations of these pollutants generally tend to be lower in rural areas.⁵⁰ However, high levels of PM₁₀ and NO₂ can often occur due to congestion on the roads of small market towns, or where road infrastructure was not designed for the volume of traffic or type of vehicles it currently accommodates. Ammonia reacts with other gaseous pollutants to form particles which account for a significant fraction of the PM_{2.5} which is the major cause of the health effects associated with air pollution.

Policy context

This section sets out some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** 'Policy, plan and programme review'.

Table 6.1. Key messages from the review of the policies, plans, and programmes

Document title	Key message
Environmental Noise Directive	The EU Environmental Noise Directive is the main EU instrument to identify noise pollution levels and to trigger the necessary action at both Member State and at EU level. To pursue its stated aims, the Noise Directive focuses on three action areas: the determination of exposure to environmental noise; ensuring that information on environmental noise and its effects are made available to the public; preventing and reducing environmental noise where necessary and preserving environmental noise quality where it is good.
Ambient Air Quality Directive	The EU Ambient Air Quality Directive ⁵¹ and the 4th Air Quality Daughter Directive ⁵² set the air quality standards against which national and local ambient air quality policies are formulated. The directives set limit values and target values for various pollutants in ambient air including nitrogen dioxide (NO ₂) and require the EU Member States to assess and report compliance and take action to rectify any exceedances of those values.
Air Quality Action Plans	The UK government and the devolved administrations are required under the Environment Act 1995 to produce a national air quality strategy. The strategy sets out how responsibilities for meeting EU limits are effectively shared between government and local authorities. Where an air quality management area (AQMA) is designated, local authorities must produce an air quality action plan describing the pollution reduction measures to be put in place in pursuance of air quality standards and objectives (generally the same as limit values).

Source: Annex A

Baseline review

Central region

There are 52 Air Quality Management Areas (AQMAs) located wholly or partly within the Central region. This is due to the predominantly urban land use and commensurately high levels of traffic (**see Vol 2 Figure 6.1**). These include AQMAs in Saffron Walden, Luton, Hitchin, Sawbridgeworth, Gerrard's Cross and the northwest of London.

⁴⁹ National Atmospheric Emissions Inventory, J MacCarthy, G Thistlethwaite, Y Pang, E Salisbury and T Misselbrook (2012), Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 1990-2010; [online] available at: http://ukair.defra.gov.uk/reports/cat07/1209130947_DA_AQPI_2010_MainBody_v1.pdf. Accessed September 2016.

⁵⁰ National Atmospheric Emissions Inventory, J MacCarthy, G Thistlethwaite, Y Pang, E Salisbury and T Misselbrook (2012), Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 1990-2010; [online] available at: http://ukair.defra.gov.uk/reports/cat07/1209130947_DA_AQPI_2010_MainBody_v1.pdf. Accessed September 2016

⁵¹ [online] available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0050>. Accessed September 2016

⁵² [online] available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:023:0003:0016:EN:PDF>. Accessed September 2016

Noise maps produced by Defra show that generally, the ambient noise level is highest around motorways and main roads; for instance noise around the M25 can exceed 70 decibels. In contrast, the surrounding areas generally have a lower ambient noise level of below 54.9 decibels.⁵³

Southeast region

There are two AQMAs within the region, both are located in Dover. The area around the A20 has been designated as an AQMA, as well as the junction of High Street and Ladywell Road (see **Vol 2 Figure 6.2**).

There is no noise data available from Defra for the Southeast region. The noisiest places are likely to be within the urban areas (along the main roads and railway networks) and the ports of Folkestone and Dover.

Future environment without the dWRMP2019

Any new development is likely to result in increased traffic flows during construction periods. This is likely to lead to increased emissions and worsening air quality on a temporary basis. This might in part be mitigated by actions set out in AQMAs and through the introduction of new technology e.g. electric cars and more fuel efficient engines. Noise levels are likely to increase, driven by increases in traffic.

Key comments from previous consultations responses

Natural England commented on the Environmental Report that “Air quality and noise impacts have been scoped out of the SEA as Affinity Water does not consider them to be relevant at the plan level. Natural England disagrees, and advises that the SEA should highlight the potential for noise, dust and air pollution to affect local communities”.

AECOM propose to retain air quality and noise in the scope of this SEA.

Key issues

- Air quality in Central region is poor in some urban areas as highlighted by the number of AQMAs in place (Dover, Saffron Walden, Luton, Hitchen, Sawbridgeworth, Gerrard’s Cross and the northwest of London); and
- Increased development is likely to see increased emissions, particularly in urban areas.

Proposed SEA scope

The construction of new development, particularly major infrastructure projects (e.g. new reservoirs) can lead to long-term temporary impacts relating to construction activities (e.g. HGV traffic, dust, noise and vibration and potential contamination through storage of chemicals on site). Given the sensitivity of the areas, it is proposed that for this SEA, the effects on air quality and noise should be assessed.

Table 6.2 presents the SEA objective and appraisal questions that will be used for the assessment in relation to this topic.

Table 6.2. SEA Framework of objectives and assessment questions:

SEA objective (will the dWRMP2019...?)	Assessment questions (would the options / programme)	Link to key issue
Minimise the effects of the option / dWRMP2019 on air quality and noise?	Impact an AQMA?	Air quality in Central region is poor in some urban areas as highlighted by the number of AQMAs in place. In particular, these are; Dover, Saffron Walden, Luton, Hitchen, Sawbridgeworth, Gerrard’s Cross and the northwest of London.

⁵³ Defra interactive noise maps [online] available at: <http://services.defra.gov.uk/wps/portal/noise/maps> Accessed September 2016

Climate

A complex relationship exists between climate change and others topic, in particular, human health, biodiversity, and water. This chapter covers factors pertaining to both climate change mitigation and climate change adaptation.

Policy context

This section sets out some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** 'Policy, plan and programme review'.

Table 7.1. Key messages from the review of the policies, plans, and programmes

Document title	Key message
Kyoto Protocol on Climate Change	The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The Protocol commits parties to reducing greenhouse gas (GHG) emissions by setting internationally binding emission reduction targets. There are currently 192 parties to the Protocol, and the first commitment period ran between 2008 and 2012. The second commitment period began on 1 January 2013 and will end in 2020.
The Paris Agreement	In 2015, 195 countries adopted the Paris Agreement. This an agreement within the United Nations Framework Convention on Climate Change dealing with GHG emissions mitigation, adaptation, and finance starting in the year 2020. Under the Paris Agreement, governments must prepare, communicate and maintain Nationally Determined Contributions, essentially national climate action plans including targets and measures to reduce emissions. Ahead of the Paris Agreement, governments were invited to submit Intended Nationally Determined Contributions setting out anticipated climate actions post-2020. While evidence suggests that, fully implemented, the INDCs will be insufficient to keep warming below 2°C, actions will be reviewed every five years with a view to restricting temperature rise to well below 2°C and, ideally, limiting it to 1.5°C.
The UK Climate Change Programme	The United Kingdom's Climate Change Programme was launched in November 2000 by the British government in response to its commitment agreed at the 1992 United Nations Conference on Environment and Development (UNCED). The 2000 programme was updated in March 2006. The stated strategies of the 2000 programme were to: <ul style="list-style-type: none"> • Improve business' use of energy, stimulate investment and cut costs; • Stimulate new, more efficient sources of power generation; • Cut emissions from the transport sector; • Promote better energy efficiency in the domestic sector, saving householders money; • Improve the energy efficiency requirements of the building regulations; • Continue cutting emissions from agriculture; • Ensure the public sector took a leading role.
The Climate Change Act 2008	The Climate Change Act was passed in 2008 and established a framework to develop an economically credible emissions reduction path. The act included a number of measures to achieve this. These are as follows: <ul style="list-style-type: none"> • The Committee on Climate Change was set up to advise the Government on emissions targets, and report to Parliament on progress made in reducing GHG emissions. • 2050 Target: The act commits the UK to reducing emissions by at least 80% in 2050 from 1990 levels. This target was based on advice from the Committee on Climate Change. The 80% target includes emissions from the devolved administrations. • Carbon Budgets: The Act requires the Government to set legally binding 'carbon budgets'. A carbon budget is a cap on the amount of greenhouse gases (GHG) emitted in the UK over a five-year period. The Committee provides advice on the appropriate level of each carbon budget which is designed to reflect cost-effective path to achieving the long terms objectives. The first four carbon budgets have been put into legislation and run up to 2027. • A National Adaptation Plan requires the Government to assess the UK's risks from climate change, prepare a strategy to address them and encourage critical organisations to do the same.
The National Planning Policy	Key messages from NPPF include that the Plan should: <ul style="list-style-type: none"> • Support the transition to a low carbon future in a changing climate as a 'core planning

Document title	Key message
Framework (NPPF)	<p>principle’;</p> <ul style="list-style-type: none"> • Plan for new development in locations and ways which reduce GHG emissions; • Actively supporting energy efficiency improvements to existing buildings; • Positively promoting renewable energy technologies; • • Direct development away from areas highest at risk of flooding, with development “...not to be allocated if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding.” Where development is necessary, it should be made safe without increasing levels of flood risk elsewhere; • Take account of the effects of climate change in the long-term, taking into account a range of factors including flooding; and • Adopt proactive strategies to adaptation and manage risks through adaptation measures including well planned green infrastructure.

Source: Annex A

Baseline review

Data on the potential effects of climate change is not available at the level of the Study Area although research on the probable effects of climate change in the UK at a regional level has been undertaken.

ClimateUK produced a summary of the climate change risks for the South East of England. This summary states that:

“The South East’s high population and levels of economic activity put considerable pressure on housing, recreation, and natural resources, and the South East has the greatest ecological footprint of all the UK regions. It also features particular vulnerability to climate change. With 1250 kilometres of coastline featuring dense population, important infrastructure, and important habitats and species, the South East is especially susceptible to sea level rise and flooding, while recent summers have demonstrated the vulnerability of people, buildings, and infrastructure to drought and overheating. The latest climate projections suggest that these impacts are likely to intensify in coming decades.”⁵⁴

Regarding the future implications of climate change, research was released in 2009 by the UK Climate Projections (UKCP09) team⁵⁵. UKCP09 provides climate information for the UK up to the end of this century. Projections of future changes to the climate are simulated from climate models. Projections are broken down to a regional level across the UK and are shown in probabilistic form, which illustrates the potential range of changes and the level of confidence in each prediction. The next projection data will be UKCP but there is no data on release at the current time.

As highlighted by the research, the effects of climate change for the South East of England by 2080 for a medium emissions scenario⁵⁶ are likely to be as follows:

- the central estimate of change in winter mean temperature is + 3°C and summer mean temperature of + 3.9°C; and
- the central estimate of change in winter mean precipitation is + 22% and summer mean precipitation is –23%.

The recently published UK Climate Change Risk Assessment 2017⁵⁷ set out a series of challenges for the water industry. Specifically, it states that:

⁵⁴ ClimateUK (2012) A Summary of Climate Change Risks for South East England [online] @ <http://climateuk.net/sites/default/files/SouthEast-NewText-1-A4.pdf>. Accessed September 2016

⁵⁵ The data was released on 18th June 2009: See: <http://ukclimateprojections.defra.gov.uk/> Accessed September 2016

⁵⁶ UK Climate Projections (2009) South East 2050s Medium Emissions Scenario [online] available at: <http://ukclimateprojections.metoffice.gov.uk/23907?emission=medium> Accessed September 2016

“Climate change is projected to reduce the amount of water in the environment that can be sustainably withdrawn whilst increasing the demand for irrigation during the driest months. At the same time the growing population will create additional demands on already stretched resources in some parts of the country.”

Note that the whole of the Operating Area is under water stress and that the South East, including Kent, is among the driest parts of England.

Central region

Jacobs reported that “116,300 tonnes of carbon dioxide equivalent were reported to Ofwat for Central region in 2011. This included 1,900 tonnes from company vehicles and transportation. This is part of the commitment to record and reduce emissions that contribute to climate change.”⁵⁸

Southeast region

Jacobs stated that “Affinity Water reported 6,100 tonnes of carbon dioxide equivalent to Ofwat for Southeast region in 2011. This includes 280 tonnes from company vehicles and transportation.”⁵⁹

Future environment without the dWRMP2019

As highlighted by the UK Climate Projections (UKCP09) team⁶⁰, the effects of climate change for the South East by 2050 for a medium emissions scenario are likely to be as follows:

- The central estimate of change in winter mean temperature is + 2.2°C and summer mean temperature of + 2.8°C; and
- The central estimate of change in winter mean precipitation is + 16% and summer mean precipitation is –19%.

This is likely to increase the risks to water resources, including from flooding and drought. As a result, water supply infrastructure will need to be planned to be resilient and adaptive to the effects of climate change.

Figure 7.1 sets out the magnitude of UK climate change impacts for various degrees of global warming. Note that the water supply deficit increases as the global temperature also rises. **Figure 7.2** sets out the climate change risks and opportunities.

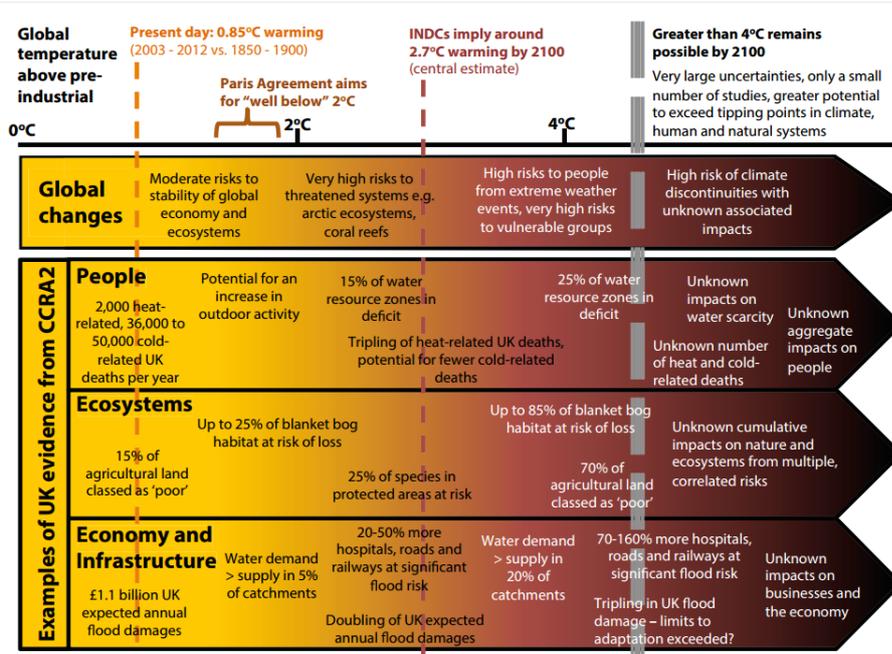
⁵⁷ Committee on Climate Change (2016) UK Climate Change Risk Assessment 2017[online] @ <https://documents.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Synthesis-Report-Committee-on-Climate-Change.pdf>. Accessed September 2016

⁵⁸ Jacobs U.K. Limited (2014) Final Water Resources Management Plan: Strategic Environmental Assessment Environmental Report.

⁵⁹ Ibid

⁶⁰ The data was released on 18th June 2009: See: <http://ukclimateprojections.defra.gov.uk/> Accessed September 2016

Figure 7.1. Magnitude of UK climate change impacts for various degrees of global warming⁶¹



Source: Warren et al. (2016) for the ASC.

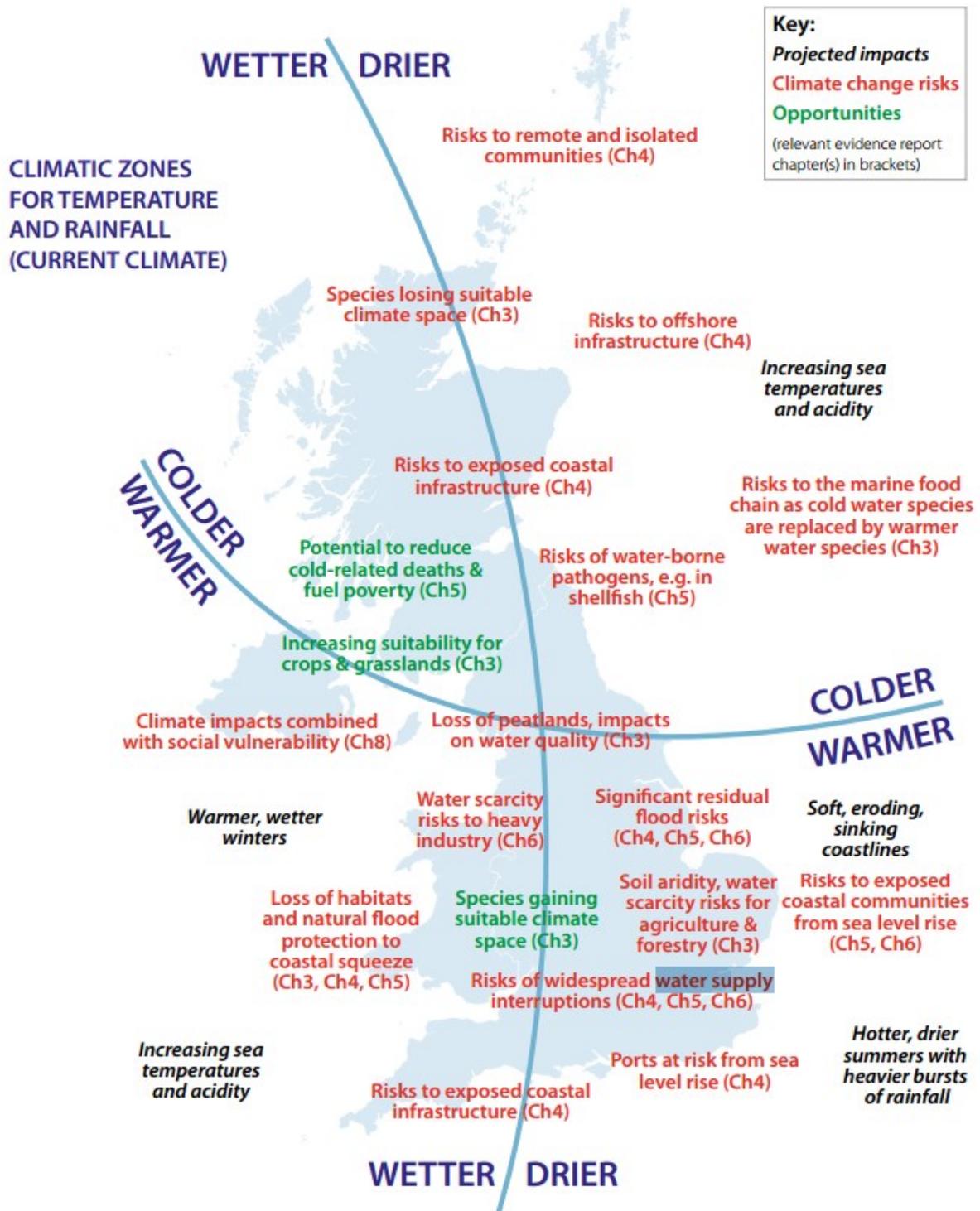
Notes: This chart shows a selection of impacts drawn from the CCRA2 chapters for different degrees of global temperature increase above a pre-industrial baseline. The methodology, references and precise temperature estimates for each of the impacts shown can be found in Warren et al. (2016) for the ASC, including for a wider range of impacts than shown above. Colours in bars denote changes in global temperature only, and do not indicate the magnitude or severity of the impacts shown (and therefore this should not be compared to the 'burning embers' diagram in IPCC (2014, Assessment Box SPM.1, Figure 1)). The temperature scale refers to the possible changes in global temperature by the end of the century but not the rate of change. Many impacts will be sensitive to the speed, as well as the magnitude, of global temperature change.

Water resource zones (WRZs) are those used for the public water supply.

Intended Nationally Determined Contributions (INDCs) towards reducing global greenhouse gas emissions are as proposed by countries in advance of the Paris Conference of the Parties (Gütschow et al., 2015).

⁶¹ Committee on Climate Change (2016) UK Climate Change Risk Assessment 2017[online] @ <https://documents.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Synthesis-Report-Committee-on-Climate-Change.pdf>. Accessed September 2016

Figure 7.2. Spatial distribution of climate change risks and opportunities for the United Kingdom⁶²



Source: ASC synthesis of the Evidence Report chapters.

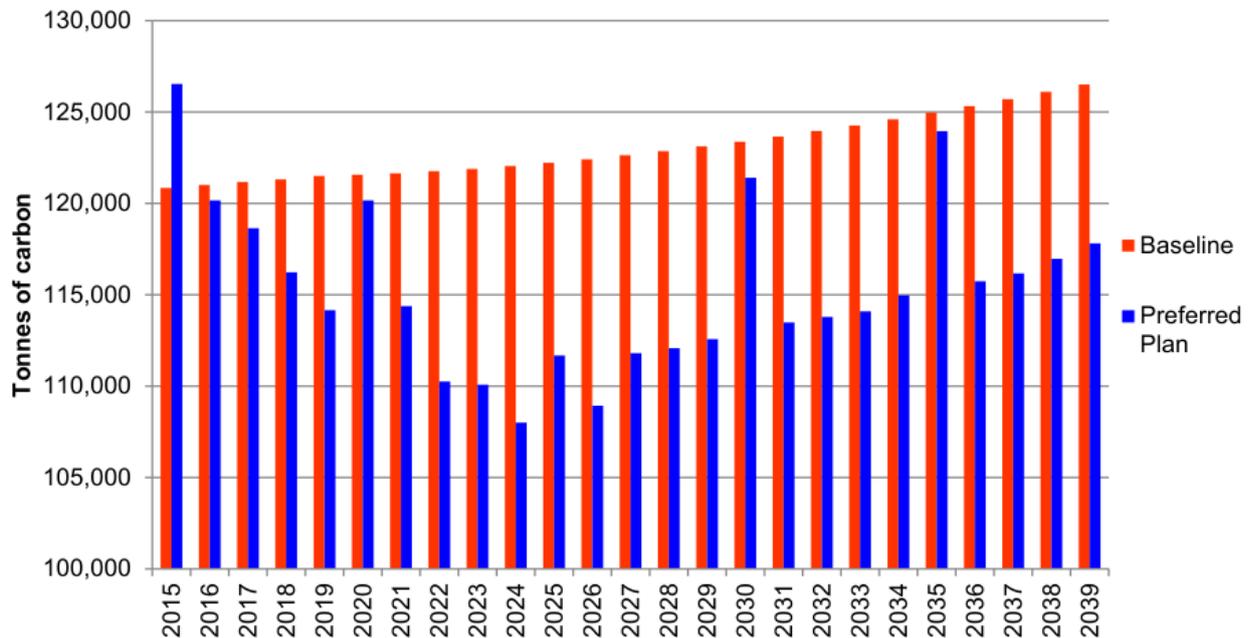
Notes: The risks presented are not exhaustive and will not be confined to the area(s) shown. The climate zones indicated are based on the current climate (see: <http://www.metoffice.gov.uk/public/weather/climate/>). Whilst all parts of the UK are expected to warm, and to become wetter (at least in winter), heat-related impacts are expected to be more pronounced in southern UK areas, and water scarcity and aridity stronger in the east.

⁶² Committee on Climate Change (2016) UK Climate Change Risk Assessment 2017[online] @ <https://documents.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Synthesis-Report-Committee-on-Climate-Change.pdf>. Accessed September 2016

In terms of climate change mitigation, per capita emissions are likely to continue to decrease as energy efficiency measures, renewable energy production and new technologies become more widely adopted. In 2008 the water industry contributed 0.8 % of annual UK GHG emissions.⁶³ This is a modest proportion but there is potential for the dWRMP2019 to reduce emissions through energy efficiency and low carbon measures.

The implementation of WRMP2014 itself is, according to Affinity Water's projected carbon footprint for WRMP2014, likely to result in a reduction in the company's carbon footprint to 2039. However, the trend in carbon emissions is still likely to be on the increase (see **Figure 7.3**).

Figure 7.3. Preferred WRMP carbon footprint, NYAA.⁶⁴



Key issues

- The Study Area is one of the driest parts of the UK and also one of the most populated;
- Summers in the South East are predicted to become hotter and drier, while winters become warmer and wetter. This has implications for summer supply shortages and winter flooding;
- The water industry contributes to 0.8 % of annual UK GHG emissions. The dWRMP2019 has the potential to play its part in reducing this contribution; and
- Affinity Water is predicted to reduce its carbon footprint over the WRMP2014 life time; however, the rate of reduction is likely to decrease towards the later end of the plan period.

Proposed SEA scope

Climate change is likely to have significant impacts on water resources through decreases in mean summer precipitation and increases in temperature. It is recognised that this presents a risk to water supply. There is potential for the dWRMP2019 to reduce climate change emissions and to adapt to potential climate change impacts. Given the risk to water supply and potential contribution to greenhouse gas emissions, it is proposed that for this SEA, the effects on climate change should be assessed.

⁶³ Environment Agency (2008) Greenhouse gas emissions of water supply and demand management options [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291728/scho0708bofv-e-e.pdf Accessed September 2016

⁶⁴ Affinity Water (2014) Final Water Resources Management Plan, 2015-2020.

Table 7.2 presents the SEA objective and appraisal questions that will be used for the assessment in relation to this topic.

Table 7.2. SEA Framework of objectives and assessment questions:

SEA objective (will the DWRMP2019...?)	Assessment questions (would the options / programme)	Link to key issue
Minimise the carbon footprint of the Company?	Reduce / increase predicted carbon footprint?	Affinity Water is predicted to reduce its carbon footprint but it is likely to increase at the later end of the plan period.
	Maximise the company's resilience to a changing climate?	Summers in the South East are predicted to become hotter and drier, while winters become warmer and wetter. This has implications for summer supply shortages and winter flooding.
Adapt to climate change?	Affect the resilience of the local environment and Affinity Water assets to climate change?	The Study Area is one of the driest parts of the UK and also one of the most populated.

Water

Water management (e.g. improving water quality, enhancing drought resilience and effectively managing flood risk) has significant inter-relationships with other topics. In particular, biodiversity and nature conservation, human health, soil management and climate change adaptation are affected by water management.

Water management and the purification and detoxification of water are 'regulating' ecosystem services delivering benefits in terms of pollution control. There is a further link between land-use and hydrology – better soil management has the potential to improve water retention in soils, slowing run-off for example. This has a bearing on water resources and flood alleviation.

Policy context

This section sets out some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** 'Policy, plan and programme review'.

Table 8.1. Key messages from the review of the policies, plans and programmes

Document title	Key message
Water Framework Directive	<p>The Water Framework Directive (WFD) was adopted and came into force in December 2000. The purpose of the WFD is to establish a framework for the protection of surface waters, transitional waters (estuaries), coastal waters and groundwater. The WFD requires Member States to establish river basin districts and for each of these a river basin management plan which are used to manage the water quality. WFD objectives include:</p> <p>For surface waters:</p> <ul style="list-style-type: none"> • prevent deterioration; • aim to achieve good ecological status (or for Artificial or Heavily Modified Water Bodies, good ecological potential); • aim to achieve good chemical status; • aim to reduce/cease emissions, discharges & losses from priority substances and priority hazardous substances and; • meet protected area objectives where relevant. <p>For groundwaters:</p> <ul style="list-style-type: none"> • prevent deterioration of status; • aim to achieve good quantitative⁶⁵ status; • aim to achieve good chemical status; • prevent or limit the input of pollutants; • reverse significant upward trends in the concentration of pollutants; and • meet protected area objectives where relevant. <p>The WFD envisages a cyclical process where river basin management plans are prepared, implemented and reviewed every six years. The first set of River Basin Management Plans (RBMPs) that covered the period 2009-2015 have been replaced by new RBMPs which cover the period to 2021.</p> <p>These updated plans set out how a minimum of 680 (14%) of waters will improve.</p>
Urban Waste Water Treatment Directive	<p>The Urban Waste Water Treatment Directive is one of a number of European Union (EU) Directives that have the objective of protecting the water environment for the animals and plants that live in and around water, for recreation, and its use as a resource for drinking water, sanitation, industry and commerce. The Directive was adopted on 21 May 1991.</p> <p>This Directive deals with urban waste water collection, waste water treatment and its discharge, as well as the treatment and discharge of waste water from certain industrial sectors. It mandates waste water collection and treatment in urban agglomerations with a population equivalent of over 2,000, and more advanced treatment in places with a population equivalent above 10,000 in sensitive areas.</p>
Drinking Water	<p>The Drinking Water Directive addresses the quality of water intended for human consumption. Its objective is to protect human health from adverse effects of any contamination of water intended</p>

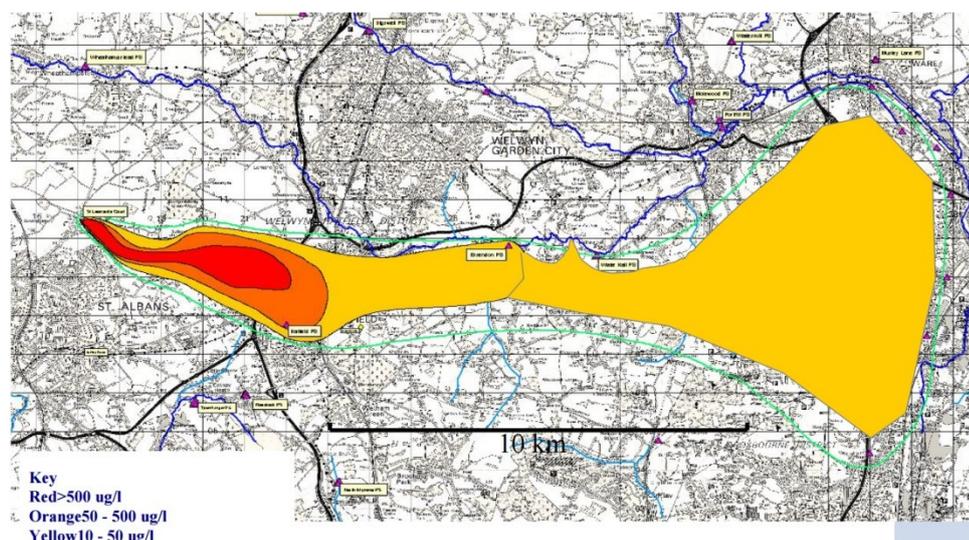
⁶⁵ Groundwater status consists of both quantitative (the amount of groundwater) and chemical (the quality of groundwater) components. To achieve good groundwater quantitative status, the available groundwater resource (i.e. the long-term average rate of overall groundwater recharge to the body) should not be exceeded by the long-term annual average rate of abstraction.

Directive	<p>for human consumption. It was implemented in relation to public water supplies by the Water Supply (Water Quality) Regulations 2000, as amended.</p> <p>The Regulations require that water companies apply a risk-based approach to ensure the directive objectives are met. It is recommended this is carried out using the World Health Organisation (WHO) 2004 Guidelines for Drinking Water Quality – Water Safety Plans (WSPs) methodology.</p>
Nitrates Directive	<p>The Nitrates Directive aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. The Nitrates Directive forms an integral part of the WFD and is one of the key instruments in the protection of waters against agricultural pressures.</p>
Water Industry Act 1991 duties- Code of Practice on Conservation, Access and conservation of natural beauty	<p>The relevant bodies/water undertakers should avoid damage arising from any works and land use changes which could have an adverse effect on the character of the landscape. Projects should be designed to:</p> <ul style="list-style-type: none"> • conserve and enhance the landscape character of an area; • use local materials and building styles wherever possible; and • if possible plant native species which are appropriate to the site and of local provenance and which contribute to the achievement of national or local biodiversity targets.
Thames River Basin Management Plan	<p>The Thames River Basin District (RBD) extends from the source of the River Thames in Gloucestershire through London to the North Sea. A large proportion of the RBD is within Greater London and as such this area of the RBD is very urbanised. In this context, population densities and transport networks put pressure on the water environment, which include:</p> <ul style="list-style-type: none"> • Discharges from sewage works; • Physical modification of rivers and estuaries to facilitate development, flood risk management or navigation. These can have significant impacts on the natural functioning of aquatic and wetland ecosystems; • Water demand in the Thames RBD is extremely high which has implications for maintaining future water supply in a manner which does not negatively affect the natural environment; and • Climate change induced sea level rise may have significant effects into the future, in terms of effects to people and properties as well as affecting ground and surface water bodies.

These challenges relate to a range of specific pressures which include:

- Abstraction;
- Diffuse pollution from agriculture such as a pesticides;
- Bromate and bromide contamination of the Vale of St. Albans Safeguard Zone in the area of Hatfield, north London(see **Figure 8.1**); and
- Physical modification such as flood defence structures.

Figure 8.1. Bromate contamination around Hatfield



Achieving good ecological status or potential by 2021 is the default objective for the RBMP. Where certain conditions apply, alternative objectives have been set. These include:

- 58% of surface water bodies maintaining or aiming to achieve good ecological status between 2015 and 2027;
- 5.8% of surface water bodies have been set an objective of reaching moderate ecological status by 2027;
- 66% of groundwater bodies have an objective of maintaining or aiming to achieve good quantitative status between 2015 and 2027; and
- 95% of groundwater bodies have an objective of maintaining or aiming to achieve good chemical status between 2015 and 2027.

Anglian Water River Basin Management Plan The Anglian River Basin District covers 27,900km² and extends from Lincolnshire to Essex north to south and from Northamptonshire to East Anglia east to west. There are over 7.1 million residents within the district which includes the urban centres of Lincoln, Northampton, Milton Keynes and Chelmsford.

Significant water management issues include:

- Physical modifications - affecting 51% of water bodies in this RBD;
- Pollution from waste water – affecting 50% of water bodies in this RBD;
- Pollution from towns, cities and transport - affecting 10% of water bodies in this RBD;
- Changes to the natural flow and level of water - affecting 10% of water bodies in this RBD;
- Negative effects of invasive non-native species - affecting 6% of water bodies in this river RBD; and
- Pollution from rural areas - affecting 47% of water bodies in this RBD.

Aiming to achieve good status or potential by 2021 is the default objective for the RBMP. Where certain and specific conditions apply, alternative objectives (to good status by 2021) have been set. These either involve taking an extended time period to reach the planned status (for example, good by 2027) or aiming to achieve a lower status (for example, moderate by 2015).

South East River Basin Management Plan There are more than 3.1 million residents within this RBD, and there are major urban centres at Southampton, Portsmouth and Ashford. The key challenges for this area include:

- High population densities and transport networks;
- Discharges from sewage works;
- Physical modification of rivers and estuaries to facilitate development, flood risk management or navigation;
- The RBD has some of the highest levels of personal water use in the country combined with high population densities resulting in very high water usage. This can have knock on negative effects for water supply to the surrounding environment; and
- Climate change induced sea level rise may have significant effects into the future, in terms of effects to people and properties as well as affecting ground and surface water bodies.

These challenges relate to a range of specific pressures that need to be dealt with in this RBD. Achieving good status or potential by 2021 is the default objective for the RBMP. Where certain conditions apply, alternative objectives have been set. These include:

- 72% of groundwater bodies have an objective of maintaining or aiming to achieve good quantitative status between 2015 and 2027; and
- 100% of groundwater bodies have an objective of maintaining or aiming to achieve good chemical status between 2015 and 2027.

Catchment Abstraction Management Strategies The Environment Agency assesses the availability of water resources for abstraction through the Catchment Abstraction Management Strategy (CAMS) approach. This approach determines how much water is reliably available for abstraction on a catchment by catchment basis.

By taking into account the amount of water already licensed for abstraction and how much water the environment needs, the Environment Agency can determine how much water is potentially available for further abstraction. CAMS are an integral part of the Water Framework Directive's River Basin Management Planning⁶⁶. These strategies are reviewed and updated when required.

The Study Area has ten CAMS in place, these are:

- Stour CAMS;
- Rother CAMS;
- Colne CAMS;
- Combined Essex CAMS;
- Upper Lee CAMS;
- Upper Ouse and Bedford Ouse CAMS;

⁶⁶ The latest round of abstraction licensing strategy's which use the CAMS process were published in 2013 [online] available at: <https://www.gov.uk/government/collections/water-abstraction-licensing-strategies-cams-process> Accessed September 2016

- Roding, Beam, Ingrebourne and Mardyke CAMS;
- Wey CAMS;
- London CAMS; and
- Thames Corridor CAMS.

Source: Annex A

Baseline review

Affinity Water currently has 130 groundwater sources, four river intakes on the River Thames, one impounding reservoir and 12 bulk supply imports from neighbouring water companies. Approximately 65% of their water is from groundwater sources and the rest from surface water. Affinity Water also provides bulk supply exports to three water companies.⁶⁷

Central region

With regards to the Study Area's location relative to RBD's, a significant proportion of the Central region lies within the Thames RBD, while a small area to the north, near Saffron Walden, is located within the Anglian RBD.

In this respect, the 2015 update to the Thames RBMP⁶⁸, and the 2015 update to the Anglian RBMP⁶⁹ highlight a number of significant water management issues for surface water and groundwater resources located within the Thames RBD and Anglian RBD.

Physical modifications: These affect 44% of water bodies in the Thames RBD, and 51% of water bodies in the Anglian RBD. The Thames RBD notes that:

“People have made many physical changes to rivers, lakes and estuaries, for example, flood defences and weirs, and changes to the size and shape of natural river channels for land drainage and navigation. These modifications alter natural flow levels, cause excessive buildup of sediment in surface water bodies and the loss of habitats and recreational uses. In many cases the uses and associated physical modifications need to be maintained. In these circumstances it may not be possible to achieve good ecological status.”

Pollution from waste water: affecting 45% of water bodies in the Thames RBD and 50% in the Anglian RBD. The Thames RBD notes that:

“Waste water, or sewage, can contain large amounts of nutrients (such as phosphorus and nitrates), ammonia, bacteria, harmful chemicals and other damaging substances. It can enter water bodies where sewage treatment technology to remove enough of the phosphorus and harmful chemicals doesn't exist, from leakages from privately owned septic tanks and, in wet weather, storm overflows can discharge untreated sewage having a significant impact on bathing waters. Population growth and changes in rainfall patterns are increasing the pressure on the sewer network.”

Pollution from towns, cities and transport: affecting 17% of water bodies in the Thames RBD and 10% of those in the Anglian RBD. The Thames RBD notes that:

“Rainwater draining from roofs, roads and pavements carries pollutants, including grit, bacteria, oils, metals, vehicle emissions, detergent and road salt drains to surface water, including estuaries and coastal waters. Many homes and workplaces have 'misconnected' drains, meaning that dirty water often enters surface waters and groundwater rather than foul sewer drains.”

⁶⁷ Affinity Water (2014) Final Water Resources Management Plan, 2015-2020.

⁶⁸ Environment Agency (2015) Thames River Basin District River Basin Management Plan [online] available at: <https://www.gov.uk/government/collections/river-basin-management-plans-2015#thames-river-basin-district-rbmp-2015> Accessed September 2016

⁶⁹ Environment Agency (2015) Anglian River Basin District River Basin Management Plan [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/500463/Anglian_RBD_Part_1_river_basin_management_plan.pdf Accessed September 2016

Changes to the natural flow and level of water: affecting 12% of water bodies in the Thames RBD, and 10% in the Anglian RBD. The Thames RBD notes that:

“Reduced flow and water levels in rivers and groundwater caused by human activity (such as abstraction) or less rainfall than usual that there is not enough water for people to use and wildlife might not be able to survive. Reduced flow affects the health of fish and exaggerates the impacts of barriers such as weirs. Climate change research shows that by 2050 England can expect significant seasonal variations, with higher winter and lower summer flows, and a reduction in flow overall. In the long term, there will be less water available to abstract for drinking, industry and irrigating crops.”

Negative effects of invasive non-native species: affecting 3% of water bodies in the Thames, and 6% in the Anglian RBD. The Thames RBD notes that:

“Invasive non-native species can have significant economic impacts. The cost of controlling invasive species to make sure that flood defences and the natural environment are not compromised is rising. American signal crayfish are becoming widespread and affect animals such as fish and invertebrates. Other species such as mitten crabs destroy habitats like reed beds and can cause banks to collapse by burrowing into them. Climate change is thought to drive certain species northwards, increasing their frequency and variety in the future and affecting the condition of water bodies.”

Pollution from rural areas: affecting 27% of water bodies in the Thames RBD and 47% of water bodies in the Anglian RBD. The Thames RBD notes that:

“Some approaches to land management have increased the amount of soils and sediment that are being washed off the land carrying phosphorus into waters which can cause excessive algae growth called 'eutrophication'. A changing climate means that more intense rainfall is likely to occur, increasing the risk of impacts further. Nitrate from fertilisers has built up in groundwater over decades and will take a long time to reduce. Sedimentation from erosion, forestry practices, saturated and compacted fields and livestock trampling on river banks has affected river ecology by smothering fish spawning grounds. Other impacts include bacteriological contaminations from animal faeces, and inappropriately stored and applied livestock slurry being washed off the land and pesticides from farming, forestry, golf courses and parks. These contaminants pose a particular threat to bathing waters, shellfish waters and drinking water.”

Surface water

40% of the water within the Central region is drawn from surface water sources including surface water sources and imports from neighbouring water companies: Thames Water, Anglian Water and Cambridge Water. Affinity Water also exports water to South East Water and Cambridge Water.⁷⁰

There are a large number of water bodies within the Study Area (**see Vol 2 Figure 8.2**). The main river catchments within the Central region include the River Thames, Colne and Lee.

Affinity Water extracts water from the principal aquifers in the Upper Ouse and Bedford Ouse. This results in low flows in the Upper Hiz and the River Oughton. Spring flows have been shown to be reduced in the Upper Hiz resulting in the drying out of the stream, particularly during periods of drought.⁷¹

⁷⁰ Affinity Water (2014) Final Water Resources Management Plan, 2015-2020.

⁷¹ Environment Agency (2013) *The Upper Ouse and Bedford Ouse Abstraction Licensing strategy* [online] @ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289835/LIT7708_df73f8.pdf. Accessed September 2016.

- Regarding flood risk, there are three flood risk areas which are within or border the Central region (see Vol 2 Figure 8.4). There are two primary flood risk areas within the Thames RBD and one which is only partly within the Thames RBD.⁷²
- The London flood risk area falls completely within the Thames river basin district. It encompasses Greater London as well as a small part of Surrey and falls across several catchments.
- The Medway flood risk area falls completely within the Thames river basin district, and within the Medway catchment.
- The South Essex flood risk area is partly within the Thames river basin district, but falls mostly within the Anglian river basin district.

Groundwater

60% of the water supply in used in the Central region is abstracted from groundwater sources with boreholes abstracting from Chalk and gravel aquifers.⁷³ The main groundwater bodies within the region are:

- Upper Lee Chalk: Currently in poor quantitative status due to the impact on surface waters and resource balance, and poor chemical status. Water in the Upper Lee CAMS area is not available for licensing due to low flows;
- Mid Chilterns Chalk: Currently in poor quantitative status due to the impact on surface waters and resource balance, and poor chemical status;
- Essex Gravels: Currently in good quantitative status, but poor chemical status;
- Lower Thames Gravel: Currently in good quantitative status and chemical status; and
- Lower Greensand: Currently in poor quantitative status and chemical status.

The Central region covers an area which is partly or fully covered by eight CAMS. (see Vol 2 Figure 8.3). These provide a water resource assessment of groundwater within the Central region.

- Colne CAMS⁷⁴: The upper reaches of the Colne's main tributaries are dependent on the unconfined Chalk as a source of groundwater to maintain their flow. The Colne CAMS states that the groundwater unit balance across the entire CAMS area shows that more water has been abstracted based on recent amounts than the amount available.
- Combined Essex CAMS⁷⁵: The Essex CAMS states that ecological features dependent on groundwater from the Chalk to the north of the confined Chalk aquifer have been identified as being at 'probable significant risk' from groundwater abstraction. Additionally, low levels of recharge to the main confined Chalk aquifer and unsustainable groundwater abstraction have been identified as issues.
- Upper Lee CAMS⁷⁶: The River Lee and its tributaries are dependent on the underlying groundwater aquifer for much of their flow, with a smaller proportion coming from overland runoff. Because of this, many tributaries of the Lee are winterbourne (only flowing after prolonged precipitation) and suffer from low flows during periods of low rainfall. It concludes that these issues can be exacerbated by abstraction. Groundwater bodies in the CAMS area are failing the requirement to meet Good Ecological Status (as required by the WFD).
- Upper Ouse and Bedford Ouse CAMS⁷⁷: The most heavily utilised groundwater sources in the Upper and Bedford Ouse are the Lower Greensand and Chalk aquifers to the south and west of the CAMS catchment. The CAMS shows that the majority of the CAMS area is comprised of

⁷² Environment Agency (2016) Thames River Basin District Flood Risk Management Plan 2015-2021: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/507138/LIT_10229_THAMES_FRMP_PART_A.pdf Accessed September 2016

⁷³ Affinity Water (2014) Final Water Resources Management Plan, 2015-2020.

⁷⁴ Environment Agency (2013) [online] available at: <https://www.gov.uk/government/publications/colne-catchment-abstraction-licensing-strategy> Accessed September 2016

⁷⁵ Environment Agency (2013) [online] available at <https://www.gov.uk/government/publications/cams-essex-abstraction-licensing-strategy> Accessed September 2016

⁷⁶ Environment Agency (2013) [online] available at <https://www.gov.uk/government/publications/upper-lee-catchment-abstraction-licensing-strategy> Accessed September 2016

⁷⁷ Environment Agency (2013) [online] available at <https://www.gov.uk/government/publications/cams-upper-ouse-and-bedford-ouse-abstraction-licensing-strategy>. Accessed September 2016

unproductive strata. Although abstraction on the west side is assessed on a case by case basis, the groundwater unit balance for the area around Dunstable (which falls within the Affinity Water Operating Area) shows more water has been abstracted based on the amount available.

- Roding, Beam, Ingrebourne and Mardyke CAMS⁷⁸: this CAMS noted that groundwater flow is generally in a southerly direction towards Dagenham. Hence most of the groundwater aquifer within the catchment is managed under the London CAMS (where chalk groundwater is confined below the London Clay).
- Wey CAMS⁷⁹: There are two main aquifers in the Wey CAMS, the Lower Greensand and the Chalk. There are currently over 220 abstraction licences in the Wey Catchment licensed to abstract over 340 ML/day in total. Groundwater abstraction accounts for around two thirds of licensed water abstraction. The CAMS notes that the area around Guildford has local resource status of 'restricted water available for licensing'.
- London CAMS⁸⁰: In the majority of the London CAMS area, groundwater bodies are below the indicative flow requirement to help support Good Ecological Status. Where the Chalk is confined, water availability underneath the London CAMS area is subject to the London licensing policy. This policy shows that there are significant portions in east and west London where the groundwater unit balance shows groundwater is available for licensing. However there are still areas to the north, centre, and south of London where the groundwater unit balance shows more water has been abstracted based on recent amounts than the amount available.
- Thames CAMS: The CAMS states that within the Affinity Water Operating Area of the Thames CAMS area, the groundwater unit balance shows more water has been abstracted based on recent amounts than the amount available.

Southeast region

Surface water

90% of water used in the Southeast region is abstracted from Chalk and Lower Greensand groundwater boreholes with a minor component from the Denge Gravels; small amounts of water are also imported from South East Water and Southern Water.⁸¹

There are two main river catchments within Southeast region; the Rother and the Dour.

The River Rother abstraction licensing strategy⁸² notes that the main pressure from the public water supply network within the catchment is found in the east around Folkestone and Hythe; and that the largest concentration of non-public water supply abstraction pressure is seen in the Romney and Walland marshes for agricultural purposes.

The Stour Abstraction Licensing Strategy⁸³ notes that the River Dour is an important groundwater-fed Chalk stream, although it has only a small catchment of around 80km². It also states that the River Dour is particularly sensitive to low flows and has been the subject of a programme seeking to reduce the frequency, duration and intensity of future low flow events.

The Southeast region, falls within the South East RBD. As such, the flood risk management plan for this district holds information on the flood risk data.⁸⁴ There is one Flood Risk Area in the RBD (**see**

⁷⁸ Environment Agency (2013) [online] available at <https://www.gov.uk/government/publications/roding-beam-ingrebourne-and-mardyke-catchment-abstraction-licensing-strategy> Accessed September 2016

⁷⁹ Environment Agency (2013) [online] available at <https://www.gov.uk/government/publications/roding-beam-ingrebourne-and-mardyke-catchment-abstraction-licensing-strategy> Accessed September 2016

⁸⁰ Environment Agency (2013) [online] available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289888/LIT_2545_705985.pdf Accessed September 2016

⁸¹ Affinity Water (2014) Final Water Resources Management Plan, 2015-2020.

⁸² Environment Agency (2013) Rother Abstraction Licensing Strategy [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289886/LIT_2575_306e9b.pdf Accessed September 2016

⁸³ Environment Agency (2013) Stour Abstraction Licensing Strategy [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289867/LIT_2048_61c7f0.pdf. Accessed September 2016

⁸⁴ Environment Agency (2016) South East River Basin District Flood Risk Management Plan 2015 – 2021 [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/507135/LIT_10221_SOUTH_EAST_FRMP_PAR_T_A.pdf Accessed September 2016

Vol 2 Figure 8.4). This was identified through the Preliminary Flood Risk Assessment process as an area of potentially significant local flood risk. However this Flood Risk Area is located within the Brighton and Hove City Council's unitary boundary, and as such is not part of the Affinity Water Southeast region.

Groundwater

All of the water resources within the Southeast region are abstracted from aquifers. The Chalk around Dover provides about 80% and the remaining 20% is abstracted from the shallow Denge Gravel aquifer and Lower Greensand around Dungeness.

The three main groundwater water bodies within the Southeast region include: The Kent Romney Marsh, the Kent Lower Greensand Eastern, and East Kent Chalk. The Southeast region covers an area which is partly or fully covered by two CAMS (see Vol 2 Figure 8.3). These provide a water resource assessment of groundwater within the Southeast region.

- **Stour CAMS:** The Stour CAMS notes that Chalk dominates the geology of the catchment in terms of water bearing potential. However, the Lower Greensands in the Upper Great Stour and the East Kent Tertiaries in the Wingham catchment are also a significant source of base flow to the rivers. The estimates on availability of water for licensing from groundwater's here vary with models on different flow rates and the estimation is the same for both ground and surface waters. However, at medium to low flow rates, the groundwater unit balance shows more water has been abstracted based on recent amounts than the amount available for a large proportion of the area.
- **Rother CAMS:** the Rother CAMS area groundwater resource is made up of the Ashdown Sands aquifer which shows a theoretical surplus of water; and the Denge Gravels aquifer. The CAMS states that a balance between abstractions and recharge is particularly important for this aquifer, not only to safeguard stable groundwater levels, but also because changing groundwater level can influence saline intrusion into the aquifer. The estimates on availability of water for licensing from groundwater here vary with models on different flow rates, and the estimation is the same for both ground and surface waters. However, availability at mid to low flow rates, shows that generally the north east corner of the CAMS area is most resilient, while the remainder of the area can suffer from low flows which result in it failing the requirement to meet Good Ecological Status.

Future environment without the dWRMP2019

Surface water

Surface water quality is likely to improve as a result of actions outlined within the RBMPs. Additionally, sustainability reductions and compliance with WFD will likely improve water quality over the life of the dWRMP2019. In the Absence of the dWRMP2019, There could be a risk that the objectives of the RBMP will not be achieved as actions to reduce demand and deliver abstraction reduction may not be carried out.

There will also be significant pressures placed on surface water resources in the future through climate change. This is likely to reduce mean summer precipitation and increase mean summer temperatures, and conversely increase precipitation during the winter. In turn this is likely to result in reductions to flow levels during the summer, which may lower river base levels. While in the winter it may result in more widespread and frequent flooding.

The population of the Operating Area is forecast to grow significantly in the future and this increase in population will also place additional supply side demand on water resources.

In the absence of the dWRMP2019, future surface water quality may be placed under a higher strain than would otherwise be the case. This is driven by a lower level of preparation for adaptation to climate change induced water scarcity combined with increasing population numbers.

Groundwater

A review of relevant CAMS documents has revealed that a high proportion of aquifers within the Operating Area are classed as over-abstracted. Although the Environment Agency have reduced

abstraction licences in these areas, it is likely that groundwater will continue to experience many of the same pressures as those experienced by surface water bodies e.g. through an increasing population.

Key comments from previous consultations responses

Surface water

The Environment Agency requested that information on the updated CAMS was included and Natural England proposed that the objective for surface water was altered to better reflect the mechanisms for achieving environmental objectives. These comments have been addressed in this report.

Groundwater

Comments received from Natural England requested that the SEA should consider whether the hydrological influence of any option stretches beyond the buffer zone, including influence on groundwater levels and flows which may support groundwater-fed habitats, as well as down-stream influences of rivers. Additional comments received from Natural England requested that if any options would be delivered outside of the supply zone (including resource developments or pipelines), then these sites and their area of hydrological influence should also be included in the SEA Study Area. The SEA will assess the implications of water transfers from outside the supply area using the available information. The sourcing of options for transfers and new pipelines outside of the dWRMP2019 area are not addressed within the WRMP as this would be considered through the neighbouring WRMP (to avoid double counting of impacts). The cumulative effects of south east wide options being considered through the Water Resources in the South East Group (WRSE) will be the subject of another assessment, which will subsequently be integrated within the Environmental Report for the dWRMP2019.

Key issues

For surface water:

- 40% of the water used within Central region comes from surface water;
- There is a requirement to ensure there is no further deterioration in the quality of surface waters;
- There are no major rivers or surface water storage areas in the Southeast region, and therefore no possibility of surface water abstractions; and
- There are three Flood Risk Areas completely or partly located within the Central region.

For groundwater:

- A large proportion of groundwater supplies within the Affinity Water Operating Area are under severe stress;
- There is a requirement to ensure there is no further deterioration in the quality of ground waters; and
- There is a high level of reliance on groundwater supplies (60% of the water used within Central region comes from groundwater while 90% of water in the Southeast region is abstracted from groundwater Chalk aquifers).

Proposed SEA scope

Surface water

The dWRMP2019 will have a direct influence on the level of abstraction from surface water resources. This influence is currently limited to the Central region as there are no major surface water storage areas currently present in the Southeast region. Through the influence on abstraction rates, the dWRMP2019 will have an indirect impact on the quantity and quality of water present within surface water bodies.

Groundwater abstractions within the Southeast region may also have indirect impact on flow rates in smaller surface water bodies present such as rivers, and in particular Chalk streams where there are unconfined groundwater aquifers present.

The dWRMP2019 may also have additional impacts on the hydro-geomorphology of water bodies through alterations to water courses such as through the use of weir's or reservoir dams.

Surface water and ground water are therefore scoped into the assessment. The assessment will focus on aspects relating to water quality, water quantity and hydro-geomorphology.

Groundwater

The dWRMP2019 will have a direct influence on the level of abstraction from groundwater resources. This in turn will impact on the quantity of water within an aquifer. It may also have wider implications in terms of the water table level. Unconfined aquifers which are over abstracted may also have additional impacts on surface water bodies such as low flow rates. The dWRMP2019 may also have impacts in terms of groundwater quality. For instance, aquifers which are located in coastal areas may be at risk from saline water intrusion if over abstraction continues. Given this, it is proposed that for this SEA, the effects on groundwater should be assessed. The assessment will focus on impacts to water table levels, saline intrusion, and groundwater pollution.

Table 8.2 presents the SEA objective and appraisal questions that will be used for the assessment in relation to this topic.

Table 8.2. SEA Framework of objectives and assessment questions:

SEA objective (will the DWRMP2019...?)	Assessment questions (would the options / programme)	Link to key issue
Protect and improve surface and groundwater body status?	Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	A large proportion of groundwater supplies within the Affinity Water Operating Area are under severe stress.
	Improve water treatment and water quality before it returns to surface water bodies?	A large proportion of groundwater supplies within the Affinity Water Operating Area are under severe stress.
	Alter water table levels and amount of water within aquifers?	60% of the water used within Central region comes from groundwater while 90% of water in the Southeast region is abstracted from groundwater Chalk aquifers.
	Increase the risk of saline intrusion or other pollution risks to the aquifers?	A large proportion of groundwater supplies within the Affinity Water Operating Area are under severe stress.
Avoid adverse impact on surface and groundwater levels and flows?	Protect or restore adequate levels of flow in rivers and streams?	40% of the water used within Central region comes from surface water.
Minimise the risk of flooding taking account of climate change?	Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	There are three Flood Risk Areas completely or partly located within the Central region.

Heritage assets and archaeology

This section sets out the policy context and the environmental baseline with respect to cultural heritage assets⁸⁵ and archaeology. It is important to note that heritage assets have significant inter-relationships with other topics, in particular human health, biodiversity, and tourism and recreation. It should also be noted that the dWRMP2019 has the potential to affect both heritage assets and archaeology.

⁸⁵ "A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing)." Also included in the scope are Conservation Areas designated by Local Planning Authorities.

Policy context

The section below includes some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** 'Policy, plan and programme review'.

Table 9.1. Key messages from the review of the policies, plans and programmes

Document title	Key message
Water Industry Act 1991 duties-Code of Practice on Conservation, Access and Recreation	<ul style="list-style-type: none"> Archaeological remains and historic buildings, and the historic environment more generally, may be subject to differing pressures. Where proposed works would result in lower water levels, there may be a threat of drying out and decay of water logged materials such as timber. Buildings, monuments and other historic features are also vulnerable to damage caused by misuse or neglect. The relevant bodies should: <ul style="list-style-type: none"> carry out surveys of archaeological, historical and architectural features; avoid disturbance of archaeological or historic features, and works damaging to the historic environment generally, and where disturbance is unavoidable, details of such features should be recorded; protect buildings, monuments and other historic features from damage caused by misuse or neglect maintain features whether or not in current use; conserve and/or record details of, for example, machinery, equipment, documents; consult local authority archaeologists in England, or the relevant regional Archaeological Trust in Wales, and conservation officers where historic or archaeological features are affected; circulate lists of surplus movable features to potential new keepers such as industrial archaeology or history societies, county archivists, civic trusts, and the English and Welsh Royal Commissioners on Ancient and Historical Monuments; and in respect of plant or machinery, consult the Science Museum or the Council for British Archaeology.
National Planning Policy Framework (NPPF)	<p>Key messages from the NPPF include that the Plan should:</p> <ul style="list-style-type: none"> Recognise heritage assets as an 'irreplaceable resource' that should be conserved in a 'manner appropriate to their significance', taking account of 'the wider social, cultural, economic and environmental benefits' of conservation, whilst also recognising the positive contribution new development can make to local character and distinctiveness. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional, and substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens and World Heritage Sites, should be wholly exceptional
Ancient Monuments and Archaeology Act	<p>The Ancient Monuments and Archaeological Areas Act 1979 was passed to protect the archaeological heritage of Great Britain.</p> <p>Section 61(12) defines sites that warrant protection due to their being of national importance as 'ancient monuments'. These can be either Scheduled Ancient Monuments or <i>"any other monument which in the opinion of the Secretary of State is of public interest by reason of the historic, architectural, traditional, artistic or archaeological interest attaching to it"</i>.</p>
Statement on the Historic Environment for England	<p>The government's Statement on the Historic Environment England 2010 calls for those who have the power to shape the historic environment to recognise its value and to manage it in an intelligent manner in light of the contribution that it can make to social, economic and cultural life. It outlines six strategic aims:</p> <ul style="list-style-type: none"> Strategic Leadership: Ensure that relevant policy, guidance, and standards across Government emphasise our responsibility to manage England's historic environment for present and future generations; Protective Framework: Ensure that all heritage assets are afforded an appropriate and effective level of protection, while allowing, where appropriate, for well managed and intelligent change; Local Capacity: Encourage structures, skills and systems at a local level which: promote early consideration of the historic environment; ensure that local decision makers have access to the expertise they need; and provide sufficiently skilled people to execute proposed changes to heritage assets sensitively and sympathetically; Public Involvement: Promote opportunities to place people and communities at the centre of the designation and management of their local historic environment and to make use of

- heritage as a focus for learning and community identity at all levels;
- Direct Ownership: Ensure all heritage assets in public ownership meet appropriate standards of care and use while allowing, where appropriate, for well managed and intelligent change; and
- Sustainable Future: Seek to promote the role of the historic environment within the Government's response to climate change and as part of its sustainable development agenda.

Source: Annex A of this SEA Scoping Report

Baseline review

Central region

There are no World Heritage Sites (WHS) within Central region but there are numerous Listed Buildings, Scheduled Monuments, and wider Conservation Areas, along with Registered Parks and Gardens. In line with comments from Historic England (then known as English Heritage) on the SEA of the previous WRMP, AECOM have included a 500 m 'buffer' around scheduled monuments and Listed Buildings as an 'area of influence'. This will be used to determine which options may have the potential to affect these assets.

The assessment will focus on those heritage assets which have been defined as at risk by the Historic England Heritage at Risk Programme. In this regard, the Listed Buildings, Places of Worship, Scheduled Monuments, and Conservation Areas designated as being at risk are shown in **Vol 2 Figure 9.1. Annex C** provides further detail on heritage assets in the Study Area which have been identified as being at risk.

Southeast region

There are no World Heritage Sites (WHS) within the Southeast region but there are numerous Listed Buildings, Scheduled Monuments, wider conservation areas along with registered parks and gardens. Notable is the historic Port of Dover which includes a number of heritage assets at risk (e.g. the Western Heights Fortifications, Fort Burgoyne and the Western Heights Conservation Area). The Heritage Assets within the Southeast region which are considered at risk are set out in **Vol 2 Figure 9.2 and Annex C**.

Key comments from previous consultations responses

In line with comments received from Historic England (then known as English Heritage) a more detailed baseline review on the historic environment has been included (specifically mapping of heritage assets, consideration of a 500 m buffer and a focus on heritage at risk) and the objective for cultural heritage and archaeology has been updated in-line with Historic England Guidance.

Key issues

- There are no internationally designated sites (World Heritage Sites) within the Study Area;
- The Central region has a large quantity of heritage assets at risk dispersed over a large area; and
- The Southeast region has considerable volumes of military defence and maritime heritage assets focused around Dover and Folkestone.

Proposed SEA scope

Heritage assets have been scoped into the SEA as the dWRMP2019 may include options that have potential impacts on heritage assets or their setting. The dWRMP2019 has the potential to affect heritage assets and archaeology through the construction of new supply options (and site facilities such as pumping stations) may create impact pathways to sensitive receptors (e.g. archaeological assets) as well as temporary impacts on heritage assets and their setting through visual intrusion. Additionally, if options have an effect on groundwater levels this could potentially impact on heritage assets located within the floodplain. Given the linkages highlighted, it is proposed that for this SEA,

the effects on heritage assets and archaeology should be assessed. The assessment will focus on heritage assets 'at risk'.

Table 9.2 presents the SEA objective and appraisal questions that will be used for the assessment in relation to this topic.

Table 9.2. SEA Framework of objectives and assessment questions:

SEA objective (will the DWRMP2019...?)	Assessment questions (would the options / programme)	Link to key issue
Conserve and enhance the historic environment, heritage assets and their settings?	Conserve and/or enhance heritage assets and the historic environment?	Large number of heritage assets 'at risk'
	Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	Large number of heritage assets 'at risk'

Geology and soils

This section sets out the policy context and the environmental baseline with respect to geology and soil management. It is important to note that soil management has significant interrelationships with other topics, in particular biodiversity and climate change adaptation.

Policy context

The section below includes some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** 'Policy, plan and programme review'.

Table 10.1. Key messages from the review of the policies, plans and programmes

Document title	Key message
Defra (2009) Safeguarding our Soils – A Strategy for England	<p>This strategy sets out policy on protecting soils for the long term and related core objectives for research. It sets out the practical steps that are needed to take to prevent further degradation of soils, enhance, restore and ensure their resilience, and improve understanding of the threats to soil and best practice in responding to them.</p> <ul style="list-style-type: none"> • Revised Common Agricultural Policy cross-compliance Soil Protection Review;⁸⁶ • A review of the need for future options under Environmental Stewardship to improve soil protection; • A new goal to significantly reduce the rate of loss of stored soil carbon by 2020; • A commitment to developing a new framework for action for peat protection, including on horticultural peat use post 2010; • Reviewing thresholds for pollutants entering soil through recycling materials to land; • Publishing a new code of practice for soil use on construction sites and a new toolkit for planners in 2010 on how to take account of soil functions through the planning system; • Reviewing the effectiveness of the existing planning policy to protect important soils and whether there is a need to update it; and • Publishing new best practice guidance on decision making for contaminated land.
Defra (2011) The Natural Choice: Securing the value of nature, The Natural Environment White Paper	<p>The Government's White Paper's set a 2030 target for all of England's soils to be sustainably managed through tackling threats to degradation. This was to be achieved, in part, by further research to explore linkages between soil degradation and the delivery of vital ecosystem services; including how to manage lowland peatlands in a way that supports efforts to tackle climate change.</p>

Source: Annex A of this SEA Scoping Report

Baseline review

Central region

The Central Region has a diverse geology. The dominant classifications are described below and in **Vol 2 Figure 8.2**.⁸⁷

- **Deep sand to clay** – this is located to the south of the regions, around Woking, Staines on Thames and Esher.

⁸⁶ Cross compliance is a set of standard requirements of the Common Agricultural Policy (CAP) to protect soils and maintain a range of both habitat and landscape features for anyone claiming payments under the Single Payments Scheme. Environmental Stewardship is the main agri-environment scheme in England and provides funding to farmers and other land managers who deliver effective environmental management on their land. One of its five primary objectives is to help protect natural resources, including soil. The England Catchment Sensitive Farming Delivery Initiative (ECSFDI) aims to tackle diffuse water pollution from agriculture in order to meet the objectives of the Water Framework Directive.

⁸⁷ The Central region also includes reading beds, alluvial sands and gravels, and river terrace deposits.

- **London Clay:** a band of clay that extends from Harrow and Rickmansworth to Epping and Harlow to the east of the region
- **Chalk:** this extends over the majority of the north of the region and extends from Amersham in the west to Saffron Waldon and Great Dunmow in the east.

Vol 2 Figure 10.1 illustrates the distribution of agricultural land across the Central Region. It can be seen that the region has a high proportion of the best and most versatile land.⁸⁸ The highest quality (Grade 1) can be found to the north east of the region (to the east of Stevenage). Further south and west the land is predominately Grade 3. Good quality land is indicative of a high level of agricultural activity; which is water dependent.

The previous SEA Scoping Report identifies that there are:

“several authorised landfill sites within Central region including at Ware, Roydon, Tyttenhanger and Sundon. There is a cluster of authorised landfills close to the M4 / M25 corridor at Egham, Wraysbury, West Drayton and Colnbrook, making use of former gravel extraction works. There are many more historic landfill sites across the region. These can carry a higher risk to potential schemes as they may not be sealed to current standards and the records may not be as complete in terms of what contaminants may be present.”⁸⁹

Southeast region

The Southeast region is slightly less diverse in geology than the Central Region (see **Vol 2 Figure 8.2**).

In terms of the availability of the highest quality agricultural land, higher quality land (Grade 2) is located to the south near St. Mary's Bay and Dymchurch and lower quality (but still the best and most versatile) can be found to the north of the region – see **Vol 2 Figure 10.2**.

The previous SEA Scoping Report identifies that there are authorised landfills at “*Sandling Sand pit near Folkestone and Austin's Lane in Dover*”.

Future environment without the dWRMP2019

Sites designated for geodiversity (i.e. SSSIs) are unlikely to be affected by the options being proposed through the dWRMP2019.

The UK Climate Change Risk Assessment (CCRA) identified that “extreme weather events, such as very high or very low temperatures and changes in precipitation, are likely to become more frequent throughout this century. These changes pose a threat to future productivity and farming and forestry business incomes. In addition, the cumulative effects from soil erosion and disease may affect businesses over many years.”

Key comments from previous consultations responses

In line with comments received from the Environment Agency and Natural England, spatial information has been gathered to help analyse the effects of the dWRMP2019 on agriculture (through the identification of options that would result in the loss of high grade agricultural land).

Key issues

Soil and therefore agriculture is threatened by the effects of climate change through:

- erosion;
- new and emerging pests and diseases; and

⁸⁸ Best and most versatile agricultural land: Land in grades 1, 2 and 3a of the Agricultural Land Classification (ALC).

⁸⁹ Jacobs U.K. Limited (2014) Final Water Resources Management Plan: Strategic Environmental Assessment Environmental Report. Accessed September 2016.

- increases or decreases in local soil moisture content.

Proposed SEA scope

Geology has been scoped out of the SEA because it is not considered that any of the options or programmes would affect the geology of the Study Area significantly.

Soil is scoped into the assessment, as options brought forward through the ddWRMP2019 may have negative effects on soil through construction etc. and may also have an effect on water supply to the agricultural industry. Soil erosion is an issue to public water supply e.g. surface water intakes) as well as the surface water bodies in terms of WFD. This will be assessed through the identification of the grade of land that an option is proposed on, and the likely proportion of land that would be lost through implementation of the option / programme.

Table 11.2 presents the SEA objective and appraisal questions that will be used for the assessment in relation to this topic.

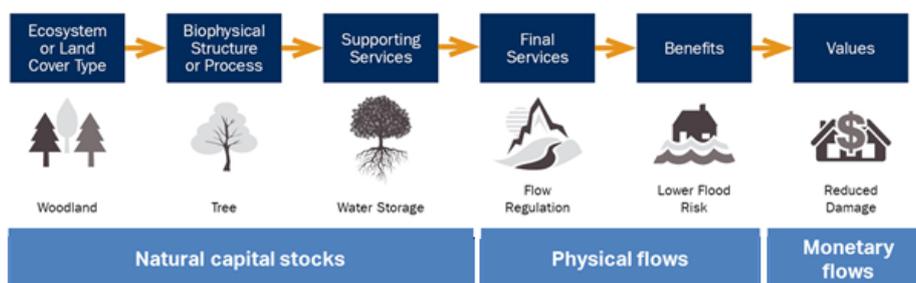
Table 11.2. SEA Framework of objectives and assessment questions:

SEA objective (will the DWRMP2019...?)	Assessment questions (would the options / programme)	Link to key issue
Minimise loss of soil quality and sterilisation of mineral resources?	Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	Scarcity of high value agricultural land.

Ecosystem services and the WRMP

Natural capital is one of the five forms of capital upon which economic activity relies, alongside financial, manufactured, human and social capital. Natural capital (or natural capital assets) gives rise to a flow of ecosystem services, which were defined by the Millennium Ecosystem Assessment (2005) as “the benefits that people obtain from ecosystems” (see **Figure 11.1.**)⁹⁰

Figure 11.1. Natural capital and ecosystem service flows



Ecosystem services include the provision of food, water, timber and fibre (provisioning services); the regulation of climate, water quality and flood risk (regulating services); opportunities for recreation, tourism and cultural development (cultural services); and underlying functions such as photosynthesis and pollination (supporting services).

A natural capital approach can take many forms, but is generally interpreted as any activity that seeks to include consideration of natural capital or ecosystem services within a decision-making process. The ways in which this can be achieved are numerous, but can include:

- Ecosystem services assessment (ESA): In which an activity’s impacts and/or dependencies on ecosystem services are quantified. This could include, for example, the volume of water extracted or an area of habitat created through quarrying operations.
- Ecosystem services valuation (ESV): In which the monetary value associated with change in ecosystem service provision is estimated and reflected in decision-making, such as the value of pollination services generated through habitat creation. An ESA is a necessary preliminary step to undertaking an ESV.
- Natural capital audit (NCA): Which measure in physical terms the gains and losses (or stocks and flows) of natural capital and associated ecosystem services over a given period of time.

The following section provides an overview of the policy context underpinning the inclusion of ecosystem services within the dWRMP2019. A high level baseline assessment of the ecosystem services provided by different habitats within the Affinity Water regions is also included.

Policy context

This section sets out some of the key messages from the context review, for a full list of documents reviewed please refer to **Annex A** ‘Policy, plan and programme review’.

Table 11.1. Key messages from the review of the policies, plans and programmes

Document title	Key message
EU Biodiversity Strategy to 2020: Our life insurance, our natural capital	<p>This EU Strategy⁹¹ sets out the steps to halt the loss of biodiversity and ecosystem services in the EU by 2020 and restore them as far as possible. The strategy outlines six main targets and 20 actions for implementation up to 2020. The six targets are:</p> <ul style="list-style-type: none"> • Halt, and where possible reverse, the deterioration in the status of all species and habitats covered by EU nature legislation. The strategy aims to achieve twice as many habitat assessments and 50% more species assessments under the Habitats Directive showing an

⁹⁰ Adapted from Potschin, M.B. and Haines-Young, R.H. (2011). Ecosystem services: Exploring a geographical perspective. Progress in Physical Geography 2011 35: 575.

⁹¹ European Parliament (2012) Our life insurance, our natural capital: an EU biodiversity strategy to 2020 [online] @ http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/EP_resolution_april2012.pdf. Accessed September 2016.

- (2011) improved conservation status, and 50% more species assessments under the Birds Directive showing a secure or improved status.
- Maintain and enhance the delivery of ecosystem services across the EU landscape by establishing green infrastructure and restoring 15% of degraded ecosystems.
 - Achieve a measurable improvement of the conservation status of species and habitats affected by agriculture through agri-environment schemes and complete forest management plans for all public forests.
 - Achieve healthy fish stocks.
 - Improved management, control and management of invasive species.
 - Increase the EU's contribution to averting global biodiversity loss.
 - The strategy is intended to support the EU's 2050 goals of protecting and valuing all natural capital in the EU and restoring lost natural capital where appropriate.

Defra (2011) The Natural Choice: securing the value of nature. The Natural Environment White Paper

This Defra paper⁹² summarises the issues surrounding the systematic undervaluing of nature in decision-making, recognising that markets for many ecosystem services are absent, and that environmental externalities are thus routinely not included in decisions. The paper sets out the government's vision for securing an environmentally sustainable future through protecting and enhancing the natural environment, developing a green economy, reconnecting people with nature, showing international leadership and investing in adequate monitoring and reporting mechanisms.

The ecosystem services-related policy ambitions outlined in the paper include:

- Publishing a new biodiversity strategy for England to help move from net biodiversity loss to net gain;
- Establishing Local Nature Partnerships to facilitate local environmental leadership and collaborate with Local Enterprise Partnerships to develop the green economy;
- Creating new Nature Improvement Areas to enhance nature and ecosystem service delivery;
- Developing a strategic approach to planning that incorporates green infrastructure and natural networks; and
- Including natural capital within the UK Environmental Accounts and setting up the Natural Capital Committee

Defra (2010) Delivering a Healthy Natural Environment. Ecosystem Approach Action Plan (updated)

The Ecosystem Approach Action Plan (EAAP) identifies that taking a whole-ecosystem approach to environmental issues can help deliver more efficient and effective environmental outcomes and encourage better decision-making. The EAAP aims to ensure that the value of ecosystem services is fully reflected in decision-making, and that environmental limits are acknowledged in the context of development.

Defra (2011) Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services

This strategy⁹³ aims *"to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people."*

The strategy aims to achieve four main outcomes:

- Maintain and enhance biodiversity and develop resilient ecological networks on land;
- Achieve the same outcomes in the marine environment;
- Achieve an improvement in the status of UK wildlife and prevent further UK extinctions;
- Engage more people in biodiversity issues;
- The strategy contains the following priority actions directly affecting the water industry:
 - *"Align measures to protect the water environment with action for biodiversity, including through the river basin planning approach under the EU Water Framework Directive"*
 - *"Continue to promote approaches to flood and erosion management which conserve the natural environment and improve biodiversity"*
 - *"Reform the water abstraction regime. The new regime will provide clearer signals to abstractors to make the necessary investments to meet water needs and protect ecosystem functioning. We will also take steps to tackle the legacy of unsustainable abstraction more efficiently"*

Ofwat (2015) Ofwat's report⁹⁴ on the benefits of upstream catchment management in the water industry

⁹² Defra (2011) The Natural Choice: securing the value of nature [online] @ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228842/8082.pdf. Accessed September 2016.

⁹³ Defra (2011) Biodiversity 2020: A strategy for England's wildlife and ecosystem services [online] @ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf. Accessed September 2016.

From catchment to customer indicates that it supports the development of payment for ecosystem services schemes if it enables water companies to meet legal water quality standards at a reduced cost. It also supports customers paying for some of the benefits that catchment management bestows upon them, as long as they are protected from bearing the costs of catchment management in the event that the catchment-level strategy fails.

Source: Annex A

Baseline review

A review of the baseline status of the ecosystem services provided by the Affinity Water regions is presented below. For each region, high-level descriptions of the different habitat types and their spatial distributions are provided.

The UK National Ecosystem Assessment (UK NEA⁹⁵) was used to identify the ecosystem services provided by each habitat types. However, the UK NEA provides an assessment of the ecosystem services provided by different habitat types for the UK as a whole, rather than for specific regions. Therefore the information from the UK NEA was supplemented with more detailed information contained in Natural England National Character Area (NCA) summaries from the South East England and London region.⁹⁶

Central Region

The Central region contains the following National Character Areas:

- The Chilterns (NCA 110);
- Thames Valley (NCA 115);
- Northern Thames Basin (NCA 111); and
- Thames Basin Heaths (NCA 129).

The Central region covers a large area surrounding London encompassing farmland, semi-urban and urban areas and woodland. Grassland and woodland habitats are irregularly dispersed across the entire area, with the predominant concentrations of woodland in the south of the region, concentrated around Windsor Great Park and Maidenhead.

Table 11.2 contains a summary of the main habitat types in the region, the ecosystem services delivered by these habitats, and an assessment of the status of these services.

Southeast Region

The Southeast region contains the following National Character Areas:

- Romney Marshes (NCA 123);
- Wealden Greensand (NCA 120); and
- North Downs (NCA 119).

The Southeast region contains mostly farmland, although it also contains coastal and woodland habitats. There is a substantial area of coastal margin habitat, most notably coastal vegetated shingle concentrated on the coast southeast of Lydd, and coastal sand dunes east of Lydd. The woodland in the region is concentrated in the northeast of the region to the northwest of Dover and around Hythe. This woodland is nearly all broadleaf, and it is interspersed with ancient woodlands.

Table 11.2 contains a summary of the main habitat types in the region, the ecosystem services delivered by these habitats, and an assessment of the status of these services.

⁹⁴ Ofwat (2015) From catchment to customer [online] @ http://www.ofwat.gov.uk/wp-content/uploads/2015/11/prs_inf_catchment.pdf. Accessed September 2016.

⁹⁵ UK National Ecosystem Assessment (2011) The UK National Ecosystem Assessment: Synthesis of Key Findings. UNEP-WCMC, Cambridge [online] @ <http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx>

⁹⁶ Available online at <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles#ncas-in-south-east-england-and-london>

Table 11.2. Baseline ecosystem services review of the Affinity Water Central region.

National Character Area	Main habitat types	Provisioning			Supporting			Cultural			Regulating		
		Food provision	Water provision	Biomass provision	Biodiversity	Sense of place / history / tranquility	Recreation	Climate regulation	Hazard regulation	Pollination	Water quality	Soil quality	Air quality
Chilterns	Woodlands		↔	↑	↑	↑	↑↑	↑	↑		↔	↔	↑
	Enclosed farmland	↑↑	↓	↑	↓↓	↔	↔	↑	↓	↓		↓	↑
	Semi-natural grasslands	↑		↔	↓↓	↔	↔	↔	↔	↓	↑	↓	↔
Thames Valley	Woodlands		↔	↑	↑	↑	↑↑	↑	↑		↔	↔	↑
	Enclosed farmland	↑↑	↓	↑	↓↓	↔	↔	↑	↓	↓		↓	↑
	Semi-natural grasslands	↑		↔	↓↓	↔	↔	↔	↔	↓	↑	↓	↔
	Wetlands & Floodplains	↓	↓	↓	↓	↔	↑	↔	↓			↓	

Continued...

National Character Area	Main habitat types	Food provision	Water provision	Biomass provision	Biodiversity	Sense of place / history / tranquility	Recreation	Climate regulation	Hazard regulation	Pollination	Water quality	Soil quality	Air quality
Thames Basin Heaths	Woodlands		↔	↑	↑	↑	↑↑	↑	↑		↔	↔	↑
	Enclosed farmland	↑↑	↓	↑	↓↓	↔	↔	↑	↓	↓		↓	↑
	Semi-natural grasslands	↑		↔	↓↓	↔	↔	↔	↔	↓	↑	↓	↔
Northern Thames Basin	Woodlands		↔	↑	↑	↑	↑↑	↑	↑		↔	↔	↑
	Enclosed farmland	↑↑	↓	↑	↓↓	↔	↔	↑	↓	↓		↓	↑
	Semi-natural grasslands	↑		↔	↓↓	↔	↔	↔	↔	↓	↑	↓	↔
	Wetlands & Floodplains	↓	↓	↓	↓	↔	↑	↔	↓			↓	

Heathland	↓↓	↔	↓	↔	↔	↔	↔	↓	↓	↔	↔	↔
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The Central Affinity region contains four NCAs (Chilterns, Thames Valley, Thames Basin Heaths and Northern Thames Basin). The main habitat types associated with these NCAs are presented along with an indication of the importance of these habitat types to ecosystem service delivery (dark green = high importance, intermediate green = medium-high importance, light green = medium-low importance, white = low importance). The ecosystem service assessment is based on the UK NEA, using the NCA characterization of ecosystem services. The arrows indicate the direction of change in the status of the ecosystem services (↑↑ = improving, ↑ = some improvement, ↔ = no net change, ↓ = some deterioration, ↓↓ = deterioration, no arrow = variable status or unknown).

Table 11.3. Baseline ecosystem services review of the Affinity Water Southeast region.

National Character Area	Main habitat types	Provisioning			Cultural				Regulating				
		Food provision	Water provision	Biomass provision	Biodiversity	Sense of place / history / tranquility	Recreation	Climate regulation	Hazard regulation	Pollination	Water quality	Soil quality	Air quality
Romney Marshes	Coastal margin	↓		↓	↓	↑	↑	↑	↔	↓		↓	
	Enclosed farmland	↑↑	↓	↑	↓	↔	↔	↑	↓	↓		↓	↑
	Semi-natural grasslands	↑		↔	↓↓	↔	↔	↔	↔	↓	↑	↓	↔
	Wetlands & Floodplains	↓	↓	↓	↓	↑	↑	↔	↓	↑		↓	
Wealden Greensand	Woodlands		↔	↑	↑	↑	↑↑	↑	↑		↔	↔	↑

Enclosed farmland	↑↑	↓	↑	↓	↔	↔	↑	↓	↓	↓	↑	
Semi-natural grasslands	↑		↔	↓↓	↔	↔	↔	↔	↓	↑	↓	↔

Continued...

Main habitat types	Food provision	Water provision	Biomass provision	Biodiversity	Sense of place / history / tranquility	Recreation	Climate regulation	Hazard regulation	Pollination	Water quality	Soil quality	Air quality
Coastal margin	↓		↓	↓	↑	↑	↑	↔	↔		↓	
Woodlands		↔	↑	↑	↑	↑↑	↑	↑		↔	↔	↑
Enclosed farmland	↑↑	↓	↑	↓	↔	↔	↑	↓	↓	↓	↓	↑
Semi-natural grasslands	↑		↔	↓↓	↔	↔	↔	↔	↓	↑	↓	↔
Coastal margin	↓		↓	↓	↑	↑	↑	↔			↓	

North Downs

The Southeast region contains three NCAs: Romney Marshes, Wealden Greensand, and North Downs. The main habitat types associated with these NCAs are presented along with an indication of the importance of these habitat types to ecosystem service delivery (dark green = high importance, intermediate green = medium-high importance, light green = medium-low importance, white = low importance). The ecosystem service assessment is based on the UK NEA, using the NCA characterization of ecosystem services. The arrows indicate the

direction of change in the status of the ecosystem services (↑↑ = improving, ↑ = some improvement, ↔ = no net change, ↓ = some deterioration, ↓↓ = deterioration, no arrow = variable status or unknown).

Future environment without the dWRMP2019

The baseline assessment suggests that within the Study Area the ecosystem services provided by a number of habitats are deteriorating. For example, water provision from wetlands and floodplains appears to be in decline in both the Thames Valley and Northern Thames Basin regions of Affinity's Central region, as does water quality in the Greater Thames Estuary. In addition, wetland biodiversity across all regions is deteriorating.

Climate change, population growth and land use change are likely to be key drivers of change in the provision of these ecosystems (water supply, water quality and biodiversity) in the future.

These ecosystem services are also key considerations within the National Environment Programme (NEP), which includes regulatory drivers such as the WFD and the UK Biodiversity Action Plan. As such, any changes to the NEP will affect the future environment without the dWRMP2019.

Key issues

Given Affinity Water's remit and obligations under the NEP, water supply, water quality and biodiversity are considered to be key ecosystem services. **Table 11.4** summarises the habitats across each of the regions for which intervention is a priority based on the current status of water supply, water quality and biodiversity.

Table 11.4. Regions, priority habitats for interventions and associated ecosystem services enhancement

Region	Priority for habitat(s) intervention	Ecosystem service(s) enhanced through intervention
Chilterns	Enclosed farmland	Water supply, biodiversity
	Semi-natural grasslands	Biodiversity
Thames Valley	Enclosed farmland	Water supply, biodiversity
	Semi-natural grasslands	Biodiversity
Thames Basin Heaths	Enclosed farmland	Water supply, biodiversity
	Semi-natural grasslands	Biodiversity
Northern Thames Basin	Enclosed farmland	Water supply, biodiversity
	Semi-natural grasslands	Biodiversity
	Wetlands and floodplains	Water supply, biodiversity
Romney Marshes	Coastal margin	Biodiversity
	Enclosed farmland	Water supply
	Semi-natural grasslands	Biodiversity, water quality
	Wetlands and floodplains	Water supply, biodiversity
Wealden Greensand	Enclosed farmland	Water supply, biodiversity
	Semi-natural grasslands	Biodiversity
	Coastal margin	Biodiversity
North Downs	Enclosed farmland	Water supply, biodiversity
	Semi-natural grasslands	Biodiversity
	Coastal margin	Biodiversity

Annex A Policy, plan and programme review

SEA topic International / national / regional policy or legislation

Population Economy and Human Health	International
	The EU Sustainable Development strategy (2006)
	The United Nations Economic Commission for Europe Aarhus Convention (1998)
	Natural Environment and Rural Communities Act 2006
	Defra (2011) Water for Life -Water White Paper
	Defra (2005) Securing the Future; Delivering UK Sustainable Development Strategy
	Defra, Environment Agency, Natural England, Forestry Commission England (2016) Creating a great place for living
	Environment Agency (2015) Creating a Better Place: Environment Agency Corporate Strategy 2014-2016
	Environment Agency (2010) Water Resources Strategy – A Regional Action Plan for Thames Region
	Environment Agency (2014) Corporate Plan 2014 – 2016
	National
	The National Planning Policy Framework (NPPF)
	Regional
	Mayor of London (2011), The London Plan Spatial Development Strategy for Greater London. Minor Alterations to London Plan 2015
	Environment Agency (2006) River Thames Alliance Thames Waterways Plan 2006 – 2011
	Environment Agency (2011) Enjoying Water - Strategic Priorities for Water Related
	Mayor of London (2011) Securing London's Water Future the Mayor's Water Strategy
	Public Rights of Way Improvement Plans (ROWIPs)
	Local level Green Infrastructure Plans and strategies, including The All London Green
Tourism and Recreation	International
	n/a
	National
	n/a
	Regional

Local Development Plans⁹⁷

The Chilterns AONB Management Plan 2014-2019

Kent Downs AONB Management Plan 2014-2019

Surrey Hills Area of Outstanding Natural Beauty Management Plan 2014-2019
Material Assets**International**

United Nations (2002) Commitments arising from the World Summit on Sustainable Development, Johannesburg
National

Waste and Emissions Trading Act 2003

Defra (2011) Government Review of Waste Policy in England 2011

HM Treasury Infrastructure UK (2014) National Infrastructure Plan

Defra (2008) Future Water: the Government's water strategy for England

Environment Agency (2009) Water Resources Strategy for England and Wales

Environment Agency (2010) Water Resources Action Plan for England and Wales

Environment Agency (2010) Water Resources Strategy – A Regional Action Plan for

Environment Act 1995

HM Treasury (2015) Fixing the Foundations: creating a more prosperous nation.
Biodiversity, Flora, Fauna**International**

United Nations (1992) Convention on Biological Diversity (CBD)

European Commission, Birds Directive (2009/147/EC)

European Commission, Fresh Water Fish Directive (2006/44/EC)

European Commission, Directive on Animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic

European Commission, Habitats Directive (1992/43/EEC)

The Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983)

The Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)

Ramsar Convention The Convention on Wetlands of International Importance (1971)

European Commission The Water Framework Directive (2000/60/EC)

⁹⁷ Rother District, Shepway District, Ashford District (B), Canterbury District (B), Dover District, Wycombe District, South Bucks District, Chiltern District, Aylesbury Vale District, South Cambridgeshire District, Brentwood District (B), Epping Forest District, Turtleford District, Chelmsford District, Braintree District, Harlow District, Three Rivers District, Hertsmere District (B), Broxbourne District (B), Dacorum District (B), East Hertfordshire District, St. Albans District (B), Welwyn Hatfield District, North Hertfordshire District, Watford District (B), Stevenage District (B), Woking District (B), Surrey Heath District (B), Runnymede District (B), Guildford District (B), Mole Valley District, Elmbridge District (B), Spelthorne District (B), Hounslow, Ealing, Havering, Hillingdon, Harrow, Brent, Barnet, Enfield, Redbridge, Camden, Haringey, Bracknell Forest (B), Central Bedfordshire, Luton (B), Slough (B), Windsor and Maidenhead (B), Tendring District, Colchester District (B), Babergh District

EU Biodiversity Strategy

National

The National Planning Policy Framework

Natural Environment White Paper

The UK post-2010 Biodiversity Framework

Defra (2011) Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services

Defra (2010) Delivering a Healthy Natural Environment. Ecosystem Approach Action Plan (updated)

Defra (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network

Defra (2011) UK National Ecosystem Assessment and Defra (2014) UK National Ecosystems Assessment Follow on, Synthesis of Key Findings

Defra (2015) The Great Britain Invasive Non-native Species Strategy

Defra (2008), England Biodiversity Strategy –climate change adaptation principles

Environment Agency (undated) Hydroecology: Integration for modern regulation

Environment Agency (undated) WFD River Basin Characterisation Project

Natural England's standing advice on protected species.

Conservation of Habitats and Species Regulations 2010 (as amended by the Conservation of Habitats and Species (Amendment) Regulations 2011 and 2012)

The Environmental Damage (Prevention and Remediation) (England) Regulations 2015

Natural Environment and Rural Communities Act 2006

Salmon and Freshwater Fisheries Act 1975

The Countryside and Rights of Way (CROW) Act 2000

Wildlife and Countryside Act 1981 (as amended)

Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI3104

Regional

Thames River Basin Management Plan (including subsidiary documents)

South East River Basin Management Plan (including subsidiary documents)

South East England Biodiversity Forum (2009) South East Biodiversity Strategy

London Biodiversity Partnership (2009) London Biodiversity Action Plan

Environment Agency (2004) Thames Salmon Action Plan (SAP)

Natural England (2014) Site Improvement Plans (SIPs) for Natura 2000 Sites

Natural England National Character Area (NCA) Profiles

Kent Environment Strategy

**Landscape,
Townscape and
Visual Amenity****International**

European Landscape Convention (2006)

National

National Policy Planning Framework (2012)

Defra (2011) The Natural Choice: Securing the value of nature. The Natural Environment White Paper

Defra (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network

Regional

The Chilterns AONB Management Plan (2014)

Kent Downs AONB Management Plan (2014)

**Air Quality and
Noise****International**

European Commission (2002) Environmental Noise Directive (2002/49/EC)

European Commission (2008) Ambient Air Quality Directive (2008/50/EC)

European Commission (2005) Thematic Strategy on Air Pollution

National

DCLG (2012) National Policy Planning Framework

Defra (2007) The Air Quality Strategy for England, Scotland and Wales

Regional

n/a

Climate**International**

Kyoto Protocol on Climate Change

European Commission (2009) Promotion of the use of energy from renewable sources Directive (2009/28/EC)

National

The UK Climate Change Programme

DCLG (2012) The National Planning Policy Framework (NPPF)

Defra (2013) The National Adaptation Programme: Making the country resilient to a changing climate

Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report

Defra (2008), England Biodiversity Strategy –climate change adaptation principles

The Climate Change Act 2008

The Energy Act 2013

UKCIP (2009) UK Climate Projections UKCP09 (2009)

Regional

Mayor of London (2011) Managing Risks and Increasing Resilience The Mayor's Climate Change Adaptation Strategy

London Climate Change Partnership (2009) Adapting to Climate Change, Creating Natural

Defra (2015) Climate adaptation reporting second round: South East Water

Surface Water**International**

European Commission Floods Directive (2007/60/EC)

European Commission The Water Framework Directive (2000/60/EC)

Urban Waste Water Treatment Directive

European Commission Drinking Water Directive (1998/83/EC) (amended 2015)

European Commission Environmental Liability Directive (2004/35/EC)

European Commission Revised Bathing Water Quality Directive (76/160/EEC)

European Commission Urban Waste Water Treatment Directive (91/271/EEC)

European Commission Nitrates Directive (91/676/EEC)

National

Defra (2005) Making Space for Water

Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report

Defra (2011) Water for Life - Water White Paper

Environment Agency (2011) National Flood and Coastal Risk Management Strategy for England

Environment Agency (2010) Water Resources Action Plan for England and Wales

Environment Agency (2009) Water Resources Strategy for England and Wales

Environment Agency (2013) Managing Water Abstraction

Flood and Water Management Act (2010)

The Water Act (2003)

Water Industry Act 1991 (as amended by the commencement of Section 36 of the Flood and Water Management Act 2010)

Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI3104

Defra (2016) Guiding principles for water resources planning for water companies operating wholly or mainly

Regional

Thames River Basin Management Plan (including subsidiary documents)

South East River Basin Management Plan (including subsidiary documents)

Catchment Abstraction Management Strategies

	<u>Environment Agency Drought Plans (various)</u>
	<u>Environment Agency (2011) Water Resources Strategy – A Regional Action Plan for</u>
	<u>Mayor of London (2011) Securing London’s Water Future The Mayor’s Water Strategy</u>
	<u>South East Marine Plan (forthcoming) Marine Management Organisation</u>
	<u>Water Resources in the South East (WRSE) Group (2014 and forthcoming) Regional</u>
Groundwater	International
	<u>Directive 2006/118EC of the European Parliament and of the council of 12 December 2006 on the protection of groundwater against pollution and deterioration</u>
	<u>European Commission The Water Framework Directive (2000/60/EC)</u>
	<u>Urban Waste Water Treatment Directive</u>
	<u>European Commission Drinking Water Directive (1998/83/EC) (amended 2015)</u>
	<u>European Commission Urban Waste Water Treatment Directive (91/271/EEC)</u>
	<u>European Commission Nitrates Directive (91/676/EEC)</u>
	National
	<u>Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report</u>
	<u>Defra (2011) Water for Life - Water White Paper</u>
	<u>Environment Agency (2010) Water Resources Action Plan for England and Wales</u>
	<u>Environment Agency (2009) Water Resources Strategy for England and Wales</u>
	<u>Environment Agency (2013) Managing Water Abstraction</u>
	<u>The Water Act (2003)</u>
	<u>The Water Environment (WFD) (England and Wales) Regulations 2003</u>
	<u>Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI3104</u>
	<u>Defra (2016) Guiding principles for water resources planning for water companies operating wholly or mainly</u>
	Regional
	<u>Anglian River Basin Management Plan (including subsidiary documents)</u>
	<u>Thames River Basin Management Plan (including subsidiary documents)</u>
	<u>South East River Basin Management Plan (including subsidiary documents)</u>
	<u>Catchment Abstraction Management Strategies (including subsidiary documents)</u>
	<u>Mayor of London (2011) Securing London’s Water Future The Mayor’s Water Strategy</u>
Cultural Heritage and Archaeology	International

The Convention for the protection of the architectural heritage of Europe (Granada Convention)

The European Convention on the protection of archaeological heritage (Valletta Convention)

National

DCLG (2012) National Policy Planning Framework

Ancient Monuments and Archaeology Act (1979)

Statement on the Historic Environment for England

Historic England (2015) The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning 3

Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment

Regional

n/a

Geology and Soils

International

Council of Europe (2003) European Soils Charter

European Commission (2006) Thematic Strategy for Soil Protection

National

Defra (2009) Safeguarding our Soils – A Strategy for England

Defra (2011) The Natural Choice: Securing the value of nature, The Natural Environment White Paper

The Countryside and Rights of Way (CROW) Act 2000

Defra (2004) The First Soil Action Plan for England

Environment Agency (2007) Soil a precious resource: Strategy for protecting, managing and restoring soil

Defra (2004) Rural Strategy 2004

Defra (2006) Sustainable Farming and Food Strategy: Forward Look

HMSO (1990) Environmental Protection Act

Wildlife and Countryside Act 1981 (as amended)

Regional

Natural England - National Character Area (NCA) profiles

Annex B national / international designated sites (update)

Special Protection Areas

Site	Grid Reference	Description of key habitats	Identified threats to site condition
Lee Valley	TQ351886	Inland water bodies (standing water, running water), bogs. Marshes and wet grassland.	Eutrophic water quality. Over-extraction of surface water, particularly during periods of drought.
South West London Water Bodies	TQ024745	Inland water bodies (standing water, running water), bogs, marshes and wet grassland.	Future decommissioning of reservoirs and maintenance works, which may require winter draw-down of reservoirs.
Dungeness, Romney Marsh and Rye Bay (also designated as a Ramsar site)	TR077261	Includes the largest and most diverse area of shingle beach in Britain, nationally important saline lagoons, natural freshwater pits and basin fens. Sheltered saltmarsh and mudflat intertidal habitats, and areas of saltmarsh, extensive grazing marshes and reedbeds. As a whole, Dungeness, Romney Marsh and Rye Bay is important for breeding and wintering waterbirds, birds of prey, passage warblers and breeding seabirds.	None identified
Thames Basin Heaths	SU881641	Heath and scrub and mixed woodland	None identified.

Special Areas of Conservation

Site	Grid Reference	Description of key habitats	Identified threats to site condition
Epping Forest	TQ410981	Beech forests, large numbers of veteran trees, rich in fungi and dead-wood invertebrates including stag beetles.	None identified.
Thursley, Ash, Pirbright and Chobham	SU976654	Wet heath, dry heath and depressions on peat substrates. The sites contain several rare plants and animals, including European nightjar, Dartford warbler, sand lizard and smooth snake.	Lowering of water tables as a result of water abstraction or other reasons which could cause loss or damage to wet heath and mire communities.
Windsor Forest and Great Park	SU953715	Oak woodland with the largest number of veteran oaks in Britain. The site contains a range of invertebrates including the violet click beetle and rich fungal assemblages.	None identified.
Dungeness		A large cusped shingle foreland which supports breeding terns and gulls. The Open Pits contain a natural succession of wetlands from species-rich fen through to sallow carr.	None identified.
Folkestone to Etchinghill Escarpment		This site consists of extensive calcareous grasslands, together with smaller areas of short-turf grassland. The site contains an important assemblage of rare and scarce species, including various orchid species.	None identified.
Parkgate Down		Consists largely of National Vegetation Classification (NVC) type CG4 <i>Brachypodium pinnatum</i> grassland. The site contains an assemblage of orchids including the nationally rare monkey orchid and late spider together with the nationally scarce musk and lady orchid.	None identified.
Lydden Temple Ewell		Lowland chalk down-land comprised of semi-natural dry grassland and scrubland. It hosts the priority habitat type "orchid rich sites"	None identified.
Dover to Kingsdown Cliffs		Vegetated sea cliffs which support a full zonation of maritime cliff communities found on chalk substrates, reflecting different levels of exposure to wind and salt spray.	None identified.

Sites of Special Scientific Interest

Site	Grid reference	Description of key habitats	Lowest condition status (2012)	Lowest condition status and reason (2016)
Affinity Water Central				
Alder Carr	tl542489	Wet valley woodland on peat fen	Unfavourable no change	Unfavourable no change
Amwell Quarry	tl377127	Former gravel pits, water bodies, marginal habitats, River Lee	Favourable	Favourable
Ash to Brookwood Heaths	su915538	Wet heath and mire with water table close to surface	Unfavourable declining	Unfavourable declining
Ashdon Meadows	tl591401	Marshy ground and hay meadows, fen and rush	Unfavourable no change	Unfavourable no change
Ashwell Springs	tl270397	Springs from River Cam	Favourable	Favourable
Barton Hills	tl088298	Mainly chalk grassland but also springs and chalk streams	Unfavourable recovering	Unfavourable recovering
Basingstoke Canal	su894544	Associated flashes, fed by calcareous springwater	Unfavourable declining	Unfavourable declining
Bentley Priory	tq156927	Neutral grassland, woodland, wetland and open water	Favourable	Favourable
Black Park	tq010841	Wet heath and carr	Unfavourable recovering	Unfavourable recovering
Blagrove Common	tl325336	Marshy grassland	Unfavourable no change	Unfavourable no change
Bookham Commons	tq127564	Open water, woodland, rough grassland, scrub and fen	Unfavourable recovering	Unfavourable recovering
Bray Pennyroyal Field	su915782	Thames floodplain, gravel pit	Unfavourable recovering	Unfavourable recovering
BrREnt Reservoir	tq219874	Reservoir with overwintering birds and waterside habitat	Favourable	Favourable
Bricket Wood Common	tl129009	Wetland habitat, lowland heath	Unfavourable no change	Unfavourable no change
Broadmoor to Bagshot Woods and Heaths	su881641	Wet heathland and valley mire	Unfavourable recovering	Unfavourable recovering
Burnham Beeches	su948857	Woodland with fragments of wetland based on springs	Unfavourable recovering	Unfavourable recovering
Chobham Common	su960665	Dry and wet heathland, bog and scrub	Unfavourable no change	Unfavourable no change
Colony Bog and Bagshot Heath	su923592	Wet and dry heath with bog	Unfavourable declining	Unfavourable declining
Cornmill Stream and Old River Lea	tl379011	Freshwater habitat and slow moving streams	Favourable	Favourable
Croxley Common Moor	tq082948	Grass heath, marshy areas and fen	Unfavourable recovering	Unfavourable recovering
Curtismill Green	tq517966	Damp and dry grassland	Unfavourable declining	Unfavourable declining
Dancersend Waterworks	sp906089	Valley wet grasslands fed by periodic flushing from the waterworks	Unfavourable recovering	Unfavourable recovering
Debden Water	tl537339	Freshwater stream, tributary of Cam, fen	Unfavourable declining	Unfavourable declining
Denham Lock Wood	tq054863	Open mire and wet woodland, water table at or near surface	Favourable	Favourable
Dropshort Marsh	tl005276	Wetland habitat, marsh and quaking bog	Unfavourable recovering	Unfavourable recovering
Dumsey Meadow	tq056666	Meadows and riverside pasture on Thames floodplain	Favourable	Favourable
Englemere Pond	su905685	Pond and reedbed	Unfavourable recovering	Unfavourable recovering
Epping Forest	tq411981	Woodland with bogs and pools	Unfavourable declining	Unfavourable declining
Esher Commons	tq115619	Heath, marsh, bog and open water	Unfavourable recovering	Unfavourable recovering
Fowlmere Watercress Beds	tl405454	Relic fen habitat, water cress beds, fed by springs	Unfavourable recovering	Unfavourable recovering

Fray's Farm Meadows	tq056859	Wet alluvial grassland, washland	Unfavourable no change	Unfavourable declining
Frogmore Meadows	tq020988	Alluvial meadows, damp grassland, marsh, fen	Unfavourable recovering	Unfavourable recovering
Great Thrift Wood	su871781	Permanently water-logged ancient woodland	Favourable	Favourable
Hatfield Forest	tl538202	Mainly woodland but also rich fen and island marshes	Unfavourable recovering	Unfavourable recovering
Hertford Heath	tl355110	Lowland heath on pebble gravels, temp and perm pools	Unfavourable recovering	Unfavourable recovering
High Wood, Dunmow	tl603219	Poorly drained wet woodland	Unfavourable no change	Unfavourable recovering
Horsell Common	tq008608	Heath, bog and pools	Unfavourable no change	Unfavourable recovering
Houghton Regis Marl Lakes	tl008233	Former quarry, marl lakes and surrounding fen	Unfavourable declining	Unfavourable declining
Hunsdon Mead	tl417109	Registered common, wet grassland	Unfavourable recovering	Unfavourable recovering
Kempton Park Reservoirs	tq118707	Reservoir with overwintering birds	Unfavourable recovering	Unfavourable recovering
Kingcup Meadows and Oldhouse Wood	tq030850	Meadows, floodplain, swamp and fen	Unfavourable recovering	Unfavourable recovering
Knight and Bessborough Reservoirs	tq030850	Reservoir with overwintering birds	Favourable	Favourable
Knocking Hoe	tl131307	Escarpment and flat bottom valley mires	Favourable	Favourable
Langham Pond	tq002719	Pond and alluvial meadows, former oxbow lake	Unfavourable recovering	Unfavourable recovering
Little Hallingbury Marsh	tl492171	Wet grassland and fen, overwintering birds	Unfavourable recovering	Unfavourable recovering
Littleworth Common	su935862	Woodland with fragments of wetland	Unfavourable recovering	Unfavourable recovering
Mid Colne Valley	tq042894	River Colne floodplain, overwintering birds	Unfavourable declining	Unfavourable declining
Moor Hall Meadows	tl329266	Spring supplied grassland, rushes and wetter marsh	Unfavourable no change	Unfavourable no change
Ockham and Wisley Commons	tq071588	Common land, bog heath open water	Unfavourable recovering	Unfavourable recovering
Old Park Wood	tq046913	Woodland with springlines, stream channels, wet hollows	Favourable	Favourable
Old Rectory Meadows	tq031874	Wet meadows and carr on Misbourne	Unfavourable declining	Unfavourable declining
Patmore Heath	tl442257	Water table close to surface, ponds and marshy areas	Unfavourable recovering	Unfavourable recovering
River Ter	tl738157	Flashy river, very low base flow discharge with high flood peaks	Favourable	Favourable
Roding Valley Meadows	tq435952	Flood meadows and marsh	Unfavourable no change	Unfavourable no change
Ruislip Woods	tq093891	Mainly woodland but also carr, fen and swamp	Unfavourable recovering	Unfavourable recovering
Rye Meads	tl386104	RSPB reserve, ancient flood meadows, marshy grassland#	Favourable	Unfavourable recovering
Sandhurst to Owismoor Bogs and Heaths	su844627	Wet and dry heathland	Unfavourable recovering	Unfavourable recovering
Sarratt Bottom	tq03199	Alluvial meadows, marsh, swamp, River Chess	Unfavourable no change	Unfavourable no change
Sawbridgeworth Marsh	tl492158	Intact river valley marshes, diverse wetland fauna	Favourable	Favourable
Sawston Hall Meadows	tl491490	Spring -fed peat meadows	Unfavourable declining	Unfavourable recovering
Smart's and Prey Heaths	su984557	Wet and dry heath	Unfavourable recovering	Unfavourable recovering
Staines Moor	tq036732	Semi-natural stretch of River Colne and alluvial meadows	Unfavourable recovering	Unfavourable declining
Stoke Common	su986852	Wet and dry heath on water-logged gravels over London Clay	Unfavourable recovering	Unfavourable recovering

Sundon Chalk Quarry	tl039275	Disused chalk pits, fen, lakes, wetland species	Unfavourable recovering	Unfavourable recovering
Swinley Park and Brick Pits	su893673	Small pools with newts and dragonflies	Unfavourable recovering	Unfavourable recovering
Syon Park	tq174765	Tall grass washland, wet grassland and reed	Unfavourable recovering	Unfavourable recovering
Tebworth Marsh	sp982289	Base rich marsh	Unfavourable recovering	Favourable
Tewinbury	tl263139	Alluvial meadows and marshes	Unfavourable recovering	Unfavourable recovering
The Coppice, Kelvedon Hatch	tq573992	Spring line base rich woodland	Favourable	Favourable
Thorley Flood Pound	tl490181	Habitats based on fluctuating water table, wash grassland	Unfavourable declining	Unfavourable declining
Thorpe Hay Meadow	tq029700	Alluvial gravels and ditches, hay meadow	Favourable	Favourable
Thorpe Park No. 1 Gravel Pit	tq025681	Gravel pit with overwintering wildfowl	Favourable	Favourable
Thriplow Meadows	tl437369	Pasture and drainage systems	Favourable	Favourable
Thriplow Peat Holes	tl450473	Relic fen and carr	Unfavourable declining	Unfavourable recovering
Tring Reservoirs	sp905130	Four reservoirs on lower chalk fed by natural springs	Unfavourable recovering	Unfavourable recovering
Turnford and Cheshunt Pits	tl373023	Former gravel pits, marsh, overwintering birds, River Lee	Favourable	Favourable
Waltham Abbey	tl376019	Heronry and water courses, River Lee	Unfavourable no change	Unfavourable no change
Water End Swallow Holes	tl229043	Sink holes in the chalk, surrounding willow carr and swamp	Favourable	Favourable
West Wood, Little Sampford	tl620332	Wet woodland	Favourable	Favourable
Wey Valley Meadows	su993455	Meadows, floodplain, swamp and fen	Unfavourable no change	Unfavourable no change
Whitmoor Common	su980533	Wet heathland, standing water, running water and marsh	Unfavourable no change	Unfavourable no change
Whittlesford-Thriplow Hummocky Fields	tl451487	Local damp spots, flooding of fields in important	Unfavourable declining	Unfavourable declining
Wormley-Hoddlesdonpark Wood South	tl317056	Woodland, small drainage catchment, stream, flushes and marsh	Unfavourable no change	Unfavourable no change
Wraysbury and Hythe End Gravel Pits	tq013739	Mosaic, islands, overwintering birds, floodplain of Thames and Colne	Unfavourable recovering	Unfavourable recovering
Wraysbury No. 1 Gravel Pit	tq004748	Lake in gravel pit, overwintering birds	Unfavourable recovering	Unfavourable recovering
Affinity Water South East				
Dungeness, Romney Marsh and Rye Bay	tr077261	Saline lagoons, standing water and basin fens	Unfavourable recovering	Unfavourable declining
Gibbin's Brook	tr116386	Bog, marshy grassland, carr	Unfavourable declining	Unfavourable declining
Sandwich Bay to Hacklinge Marshes	tr348621	Mainly coastal habitats but also freshwater marsh	Unfavourable declining	Unfavourable declining
Seabrook Stream	tr177367	Alder carr and fen, springline, reed swamp	Unfavourable recovering	Unfavourable recovering
Wye and Crundale Downs	tr079440	Grassland and fen communities and wet woodland	Unfavourable recovering	Unfavourable recovering

Annex C heritage assets at risk in the Central Region

Name	Type
The Greenway, Uxbridge	Conservation Area
Harmondsworth Village, Heathrow Villages	Conservation Area
Black Jacks Lock and Copper Mill Lock, Harefield	Conservation Area
Botwell (Thorn/EMI), Hayes	Conservation Area
Botwell (Nestles), Hayes	Conservation Area
Longford Village, Heathrow Villages	Conservation Area
Morford Way, Eastcote, Ruislip	Conservation Area
Cranford Park, Cranford	Conservation Area
Bulls Bridge, Hayes	Conservation Area
Harlington Village, Heathrow Villages	Conservation Area
Brooklands, Byfleet	Conservation Area
Norwood Green, Southall	Conservation Area
Hanwell Village Green, Hanwell W7	Conservation Area
Cuckoo Estate, Hanwell W7	Conservation Area
College Farm, Finchley N3	Conservation Area
High Town Road	Conservation Area
Plaiters Lea, Town Centre	Conservation Area
Northwood Town Centre, Green Lane, Northwood	Conservation Area
Wormley	Conservation Area
Hanwell flight of locks and brick boundary wall of St Bernard's Hospital	Scheduled Monument
Moated site at Sudbury golf course, Wembley	Scheduled Monument
Linear earthworks in Pear Wood, west of Watling Street	Scheduled Monument
Moated site, west bank of River Pinn, near Ickenham (1/2 mile (800m) north west of church)	Scheduled Monument
Manor Farm moat, Ickenham	Scheduled Monument
Grim's Ditch: section north of Blythwood House	Scheduled Monument
Windmill Bridge	Scheduled Monument
Romano-British site 1000yds (910m) west of East Bedfont parish church	Scheduled Monument
Double ditched enclosure beside A30 road 500yds (460m) west of East Bedfont parish church	Scheduled Monument
Grim's Ditch: section extending 1500yds (1370m) north east from Oxhey Lane	Scheduled Monument
Site of Waltham Hall, Takeley	Scheduled Monument
The Aubreys camp, Redbourn	Scheduled Monument
Wheathampstead earthwork incorporating Devils Dyke and the Slad, Wheathampstead / Sandridge	Scheduled Monument
Grim's Ditch: four linear sections between Uxbridge Road and Oxhey Lane	Scheduled Monument
Triple ditches at Galley Hill, Sandon / Kelshall	Scheduled Monument
Ring ditch and enclosure, Newnham	Scheduled Monument
Dunstable Priory, Dunstable	Scheduled Monument
Settlement site north east of Letty Green, Hertingfordbury	Scheduled Monument
Roman site near railway station, Braughing / Standon	Scheduled Monument
Moated site at Down Barns Farm	Scheduled Monument
Roman villa 1000yds (910m) north east of Ashwell village, Guilden Morden	Scheduled Monument
Stansted Castle: a ringwork and associated bailey 100m north of Elms Farm, Stansted Mountfitchet	Scheduled Monument

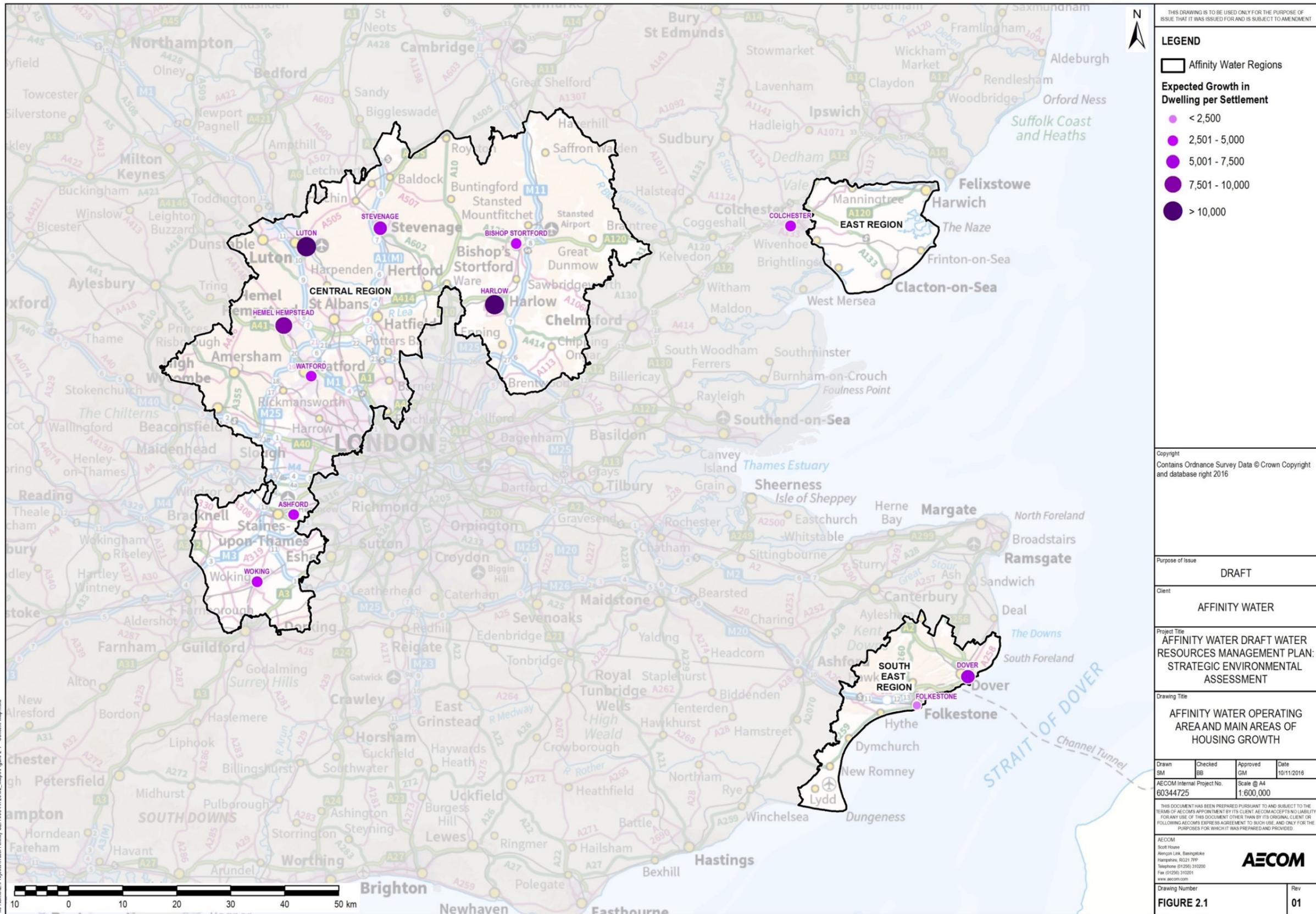
Two bowl barrows at Bygrave, 650m east of Park Wood, Bygrave	Scheduled Monument
Thundridgebury moated enclosure and associated remains of Thundridgebury House, St Mary and All Saints' Church and graveyard, Thundridge	Scheduled Monument
Wymondley Priory, barn, moat, associated earthworks, enclosures, platforms, hollow-way and conduit head, Wymondley	Scheduled Monument
Roman fort, Roman town, Roman and Anglo-Saxon cemeteries at Great Chesterford, Great Chesterford	Scheduled Monument
Roman villa 500m north east of Harlowbury	Scheduled Monument
Romano-British small town and late Iron Age settlement at Baldock	Scheduled Monument
Slight univallate hillfort on Wilbury Hill, Letchworth Garden City / Ickleford	Scheduled Monument
Romano-Celtic temple 400m south of Dell's Farm, Great Chesterford	Scheduled Monument
Brockley Hill Romano-British pottery and settlement	Scheduled Monument
A London mobilisation centre known as the North Weald Redoubt, North Weald Bassett / Bobbingworth	Scheduled Monument
Pinner deer park, Pinner Park Farm	Scheduled Monument
Totternhoe Castle: a motte and bailey castle, medieval quarries and cultivation terraces, Totternhoe	Scheduled Monument
Ruins of Church of St Etheldreda, Chesfield, Graveley	Scheduled Monument
Minsden Chapel, Whitwell Road, Langley	Scheduled Monument
Walls of moated site at Grove Farm, Ashley Green	Scheduled Monument
Bury Hill, Castle Lane, Saffron Walden	Scheduled Monument
Remains of St Mary and All Saints, Old Church Lane, Thundridge	Scheduled Monument
Latton Priory, London Road, North Weald Bassett	Scheduled Monument
Essex Redoubt at Ongar Radio Station, North Weald Bassett / Bobbingworth	Scheduled Monument
The Benedictine Priory of St Mary (Sopwell Priory) and the post-medieval mansions known as Sopwell House or Lee Hall	Scheduled Monument
The Railway Straight-Brooklands Motor Racing Circuit, Byfleet	Scheduled Monument
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The Benedictine Priory of St Mary (Sopwell Priory) and the post-medieval mansions known as Sopwell House or Lee Hall	Scheduled Monument
The Railway Straight-Brooklands Motor Racing Circuit, Byfleet	Scheduled Monument
Old Stanmore Church, Church Road, Stanmore	Listed Building
Parish Church of All Saints, Church Lane, Little Munden	Listed Building
Church of St Mary the Virgin, The Street, High Ongar	Listed Building
Parish Church of St Christopher Willingale Doe, Village Street, Willingale	Listed Building
Church of St Michael and All Angels, Church Lane, Sunninghill, Sunninghill and Ascot	Listed Building
Church of St Nicholas, Church Square, Shepperton	Listed Building
Church of St Mary the Virgin, The Street, Manuden	Listed Building
Church of St Andrew, St Andrew Street, Hertford	Listed Building
Church of St Nicholas, Willingale Road, Fyfield	Listed Building
Church of St Faith, Barton Road, Hexton	Listed Building
Church of St Mary, Church Street, Baldock	Listed Building
Church of St Mary Magdalene, Squires Bridge Road, Sunbury	Listed Building
Barn at Little Canfield Hall, Little Canfield	Listed Building
College Farm Dairy, Fitzalan Road N3	Listed Building
Physic Well, Well Approach	Listed Building
Remains of old church tower of St Mary and All Saints Church, Thundridge	Listed Building
Southall Manor House, The Green, Southall	Listed Building

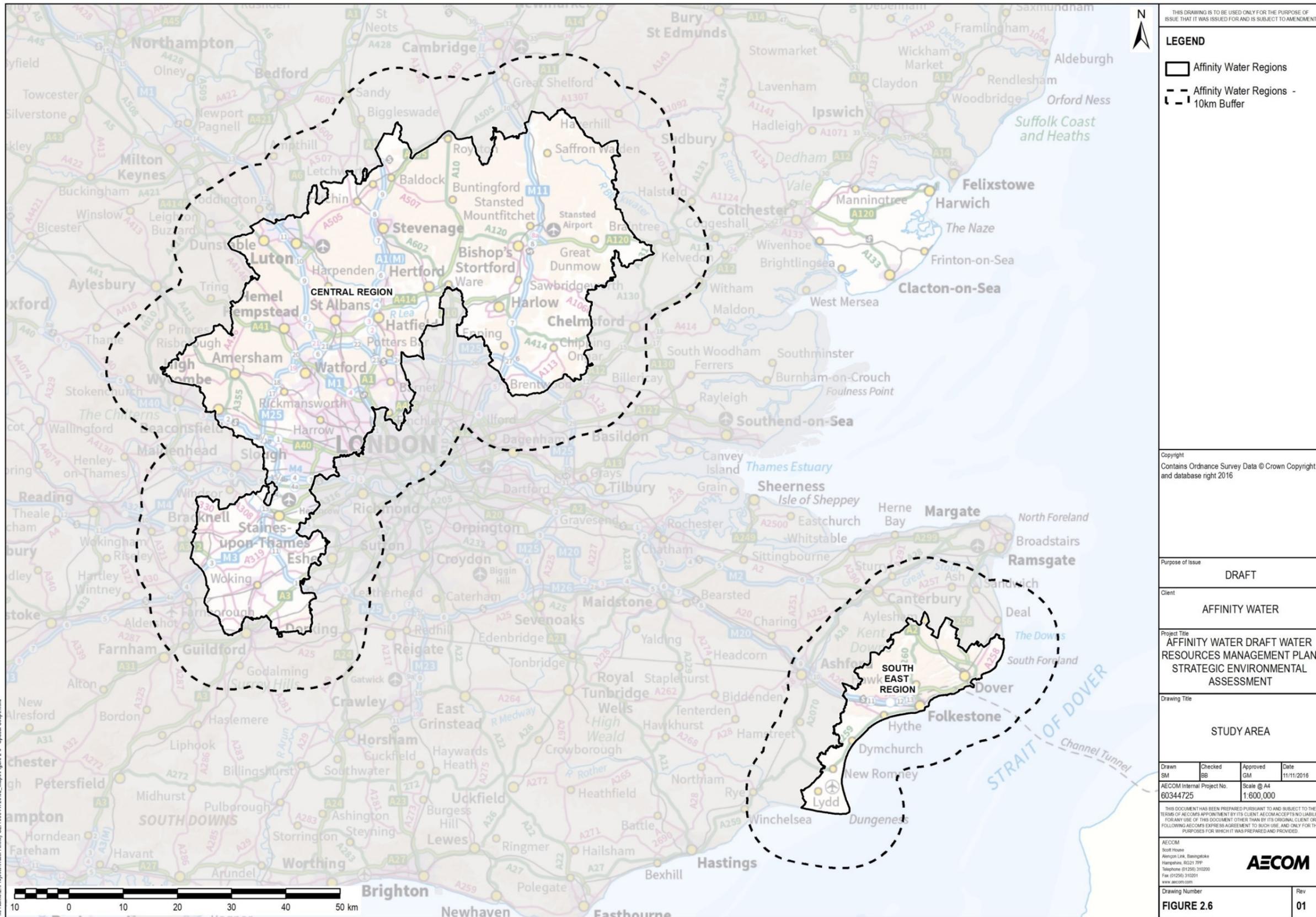
St Bernard's Hospital, Uxbridge Road, Southall	Listed Building
Twyford Abbey, Twyford Abbey Road NW10	Listed Building
Norwood Hall, Norwood Green Road, Southall	Listed Building
Boundary wall fronting road (Hill House), 173, Stanmore Hill (West Side), Stanmore	Listed Building
Brick Kiln to south east of the Kiln, Common Road, Stanmore	Listed Building
Pinner Park Farmhouse, George V Avenue, Pinner	Listed Building
Cannons Farm Barn, Hereford Gardens, Pinner	Listed Building
Garden wall to Bernays Gardens, Old Church Lane, Stanmore	Listed Building
Langley Farm Barn, Breakspear Road North, Harefield, Northwood	Listed Building
Nurses Home in grounds of Hillingdon Hospital, Pield Heath Road, Hillingdon	Listed Building
Cranford House Stables, Roseville Road, Cranford	Listed Building
Breakspear House, Breakspear Road North, Harefield	Listed Building
Mount Vernon Hospital, Rickmansworth Road, Northwood	Listed Building
Benlow Works, Silverdale Road, Hayes	Listed Building
Harefield Park (annexe to Harefield Hospital), Hill End Road, Harefield	Listed Building
The Dower House, 393, High Street, Harlington	Listed Building
Former King Henry public house and stables, 456, Bath Road, Longford	Listed Building
Round House, the village lock up, High Street	Listed Building
Lych gate to south of Church of St Mary, Church Walk, Hayes	Listed Building
Garden walls to Church Gardens Nursery, Church Hill, Harefield	Listed Building
Wall in front of numbers 30 to 36 (even), Church Road, Hillingdon	Listed Building
Railway Hotel including sign in front and former off-sales building to west, Station Road, Edgware	Listed Building
Knebworth House, Knebworth	Listed Building
North Hertfordshire Masonic Lodge (the Cloisters), Barrington Road, Letchworth Garden City	Listed Building
Tilty Mill, Tilty	Listed Building
Barn at rear of the George Public House, High Street, Great Missenden	Listed Building
Langleybury House, Langleybury, Abbots Langley	Listed Building
Paine Bridge at Brocket Hall, Marford Road, Lemsford, Hatfield	Listed Building
Little Cassiobury and former stable block, Hempstead Road, Watford	Listed Building
Frogmore House, High Street (north east side), Watford	Listed Building
West Barn at Rectory Farm, Shillington Road, Pirton	Listed Building
Harefield Grove, Rickmansworth Road, Harefield	Listed Building
Feltham House, Elmwood Avenue, Feltham	Listed Building
Walls to east and south of garden of number 28 (Coombe House), Church Road, Hillingdon	Listed Building
Front garden wall, The Beeches, High Street, Cowley	Listed Building
Boundary wall fronting road from Nos 118-128, Stanmore Hill (east side), Stanmore	Listed Building
Enterprise House, Blyth Road, Hayes	Listed Building
Monument to Major John Cartwright, St Mary at Finchley Churchyard, Hendon Lane N3	Listed Building
Cellars of former Cranford House, Roseville Road, Cranford	Listed Building
The stable block, north east of Harefield Park, (annexe to Harefield Hospital), Hill End Road, Harefield	Listed Building
Hubbard's Farm Barn and outbuildings, West Drayton Road, Colham Green, Uxbridge	Listed Building

Headstone Manor, Pinner View, Harrow	Listed Building
Barn to the west of Weekly House, Bath Road, Harmondsworth	Listed Building
Walls in front of numbers 52-58 (even) and along west end of property, Church Road, Hillingdon	Listed Building
Littlebury Farmhouse, Romford Road, Stanford Rivers	Listed Building
Kingsmoor House, Paringdon Road	Listed Building
Wall in front of numbers 40 to 50 (even), Church Road, Hillingdon	Listed Building
The stable block, south east of Harefield Park, (annexe to Harefield Hospital), Hill End Road, Harefield	Listed Building
The Cedars, 66, High Street, Uxbridge	Listed Building
Gatehouse at Hillingdon-Uxbridge Cemetery, Uxbridge Road	Listed Building
College Farm - main building, Fitzalan Road N3	Listed Building
Silo, Fitzalan Road, College Farm N3	Listed Building
Toll Gate House, Spaniards Road, Highgate NW3	Listed Building
The Water Tower, East End Road, Finchley N3	Listed Building
The Bothy, East End Road, Finchley N3	Listed Building
Harrow Magistrates Court, Rosslyn Crescent, Wealdstone	Listed Building
Cinema, RAF Uxbridge, Grays Road, Uxbridge	Listed Building
The Rayners public house, 23, Village Way East	Listed Building

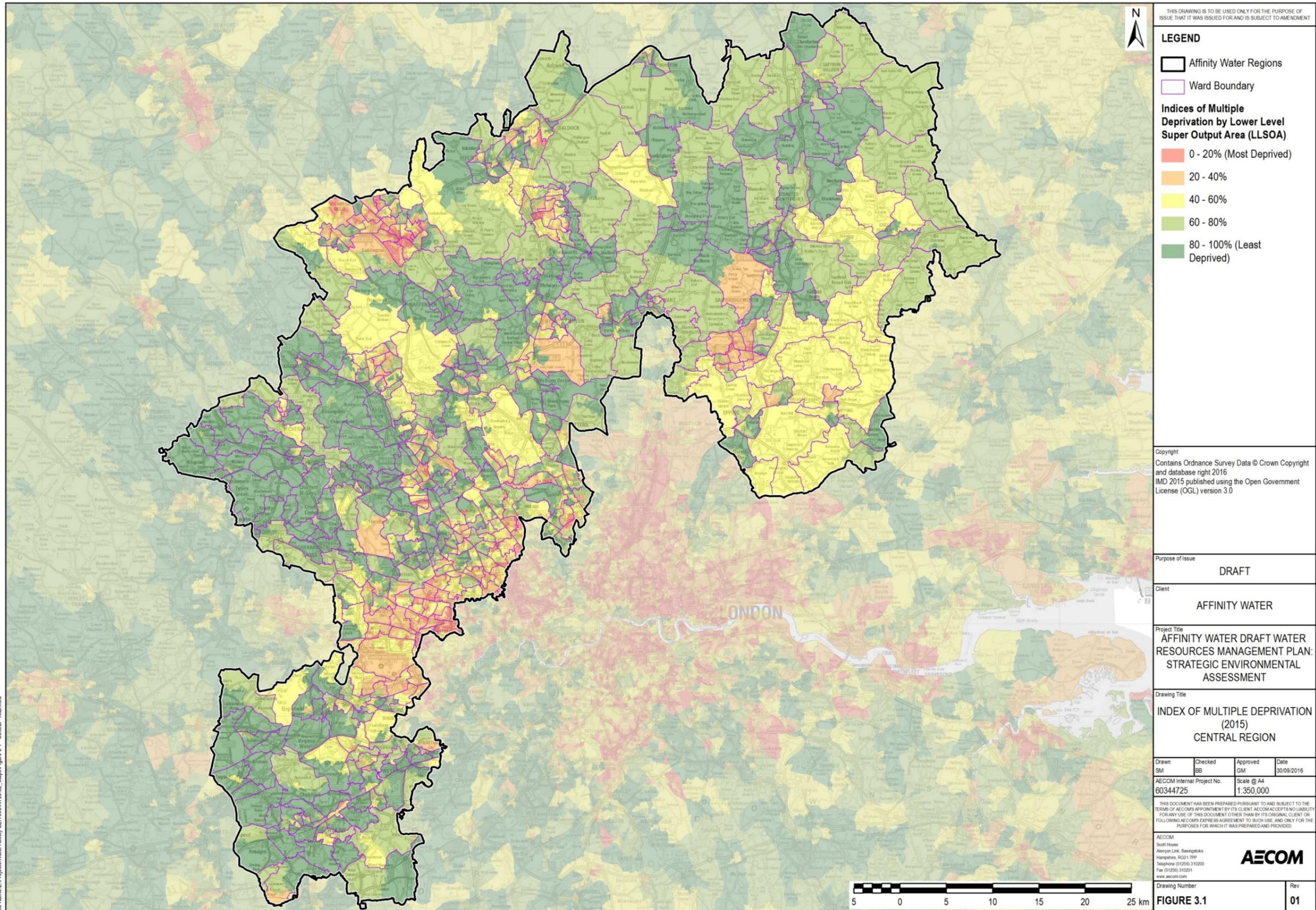
Annex D Scoping figures



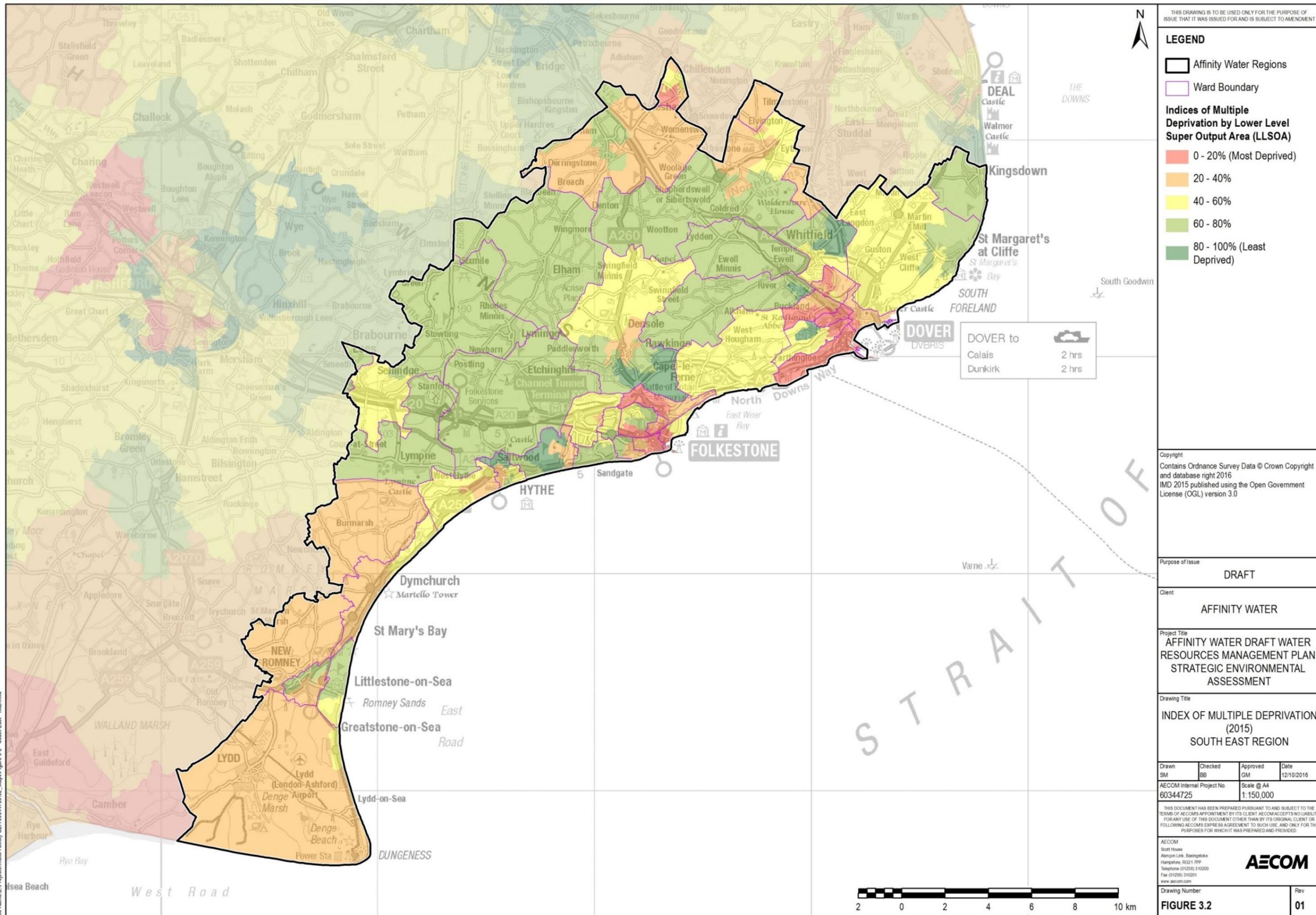
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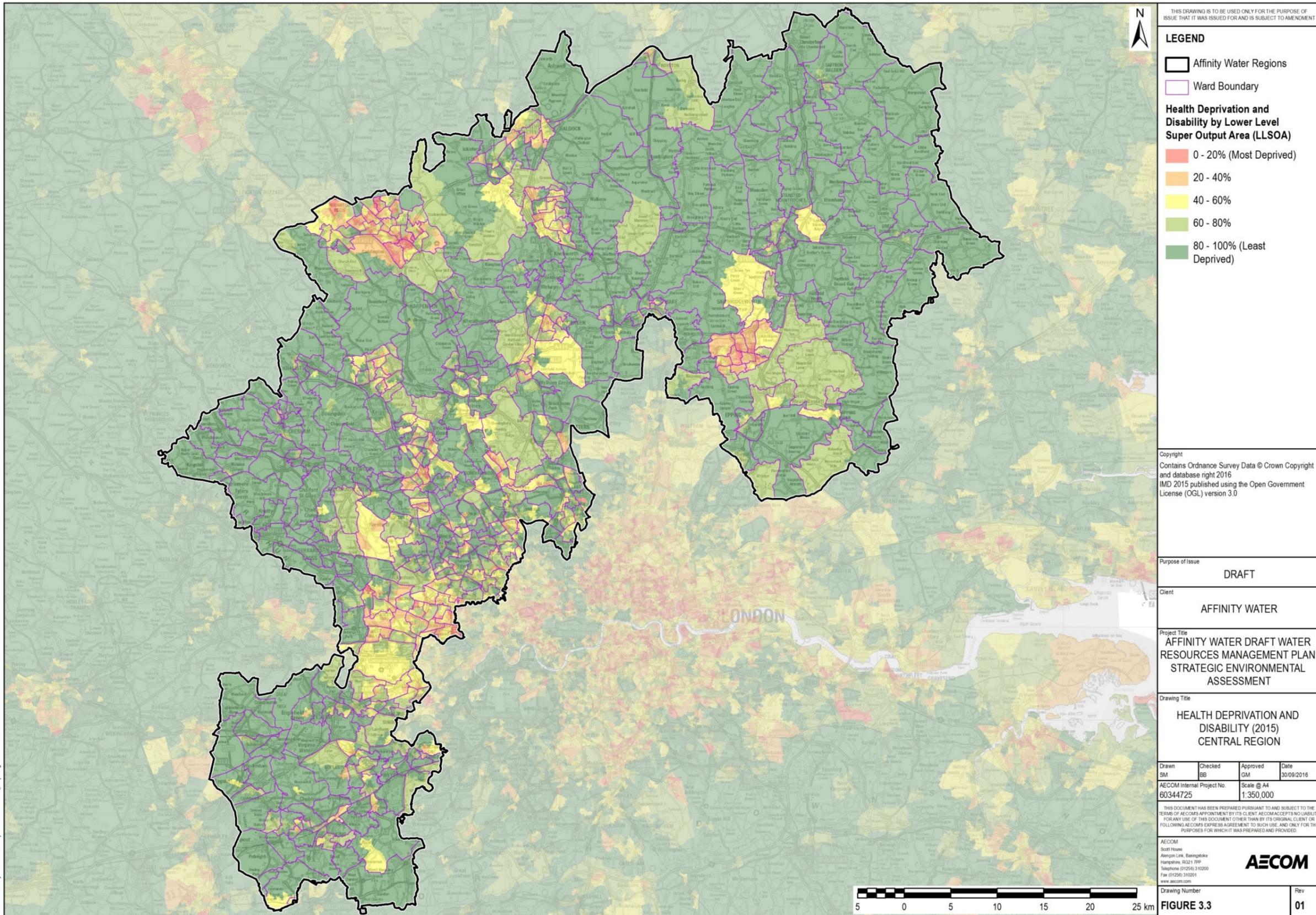


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LEGEND

- Affinity Water Regions
- Ward Boundary

Health Deprivation and Disability by Lower Level Super Output Area (LLSOA)

- 0 - 20% (Most Deprived)
- 20 - 40%
- 40 - 60%
- 60 - 80%
- 80 - 100% (Least Deprived)

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Purpose of Issue
 DRAFT

Client
 AFFINITY WATER

Project Title
 AFFINITY WATER DRAFT WATER RESOURCES MANAGEMENT PLAN: STRATEGIC ENVIRONMENTAL ASSESSMENT

Drawing Title
 HEALTH DEPRIVATION AND DISABILITY (2015) CENTRAL REGION

Drawn SM	Checked BB	Approved GM	Date 30/09/2016
AECOM Internal Project No. 60344725		Scale @ A4 1:350,000	

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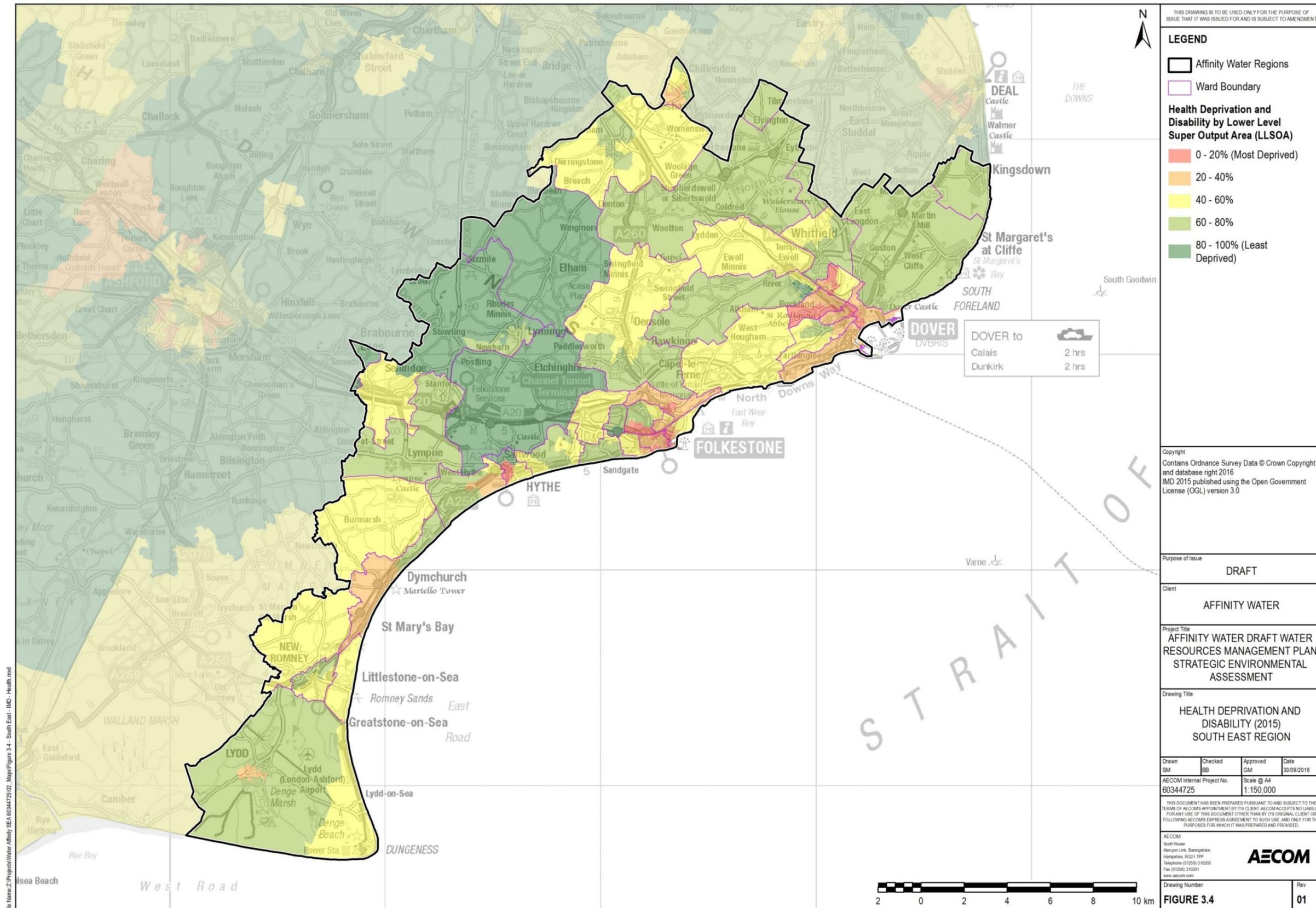
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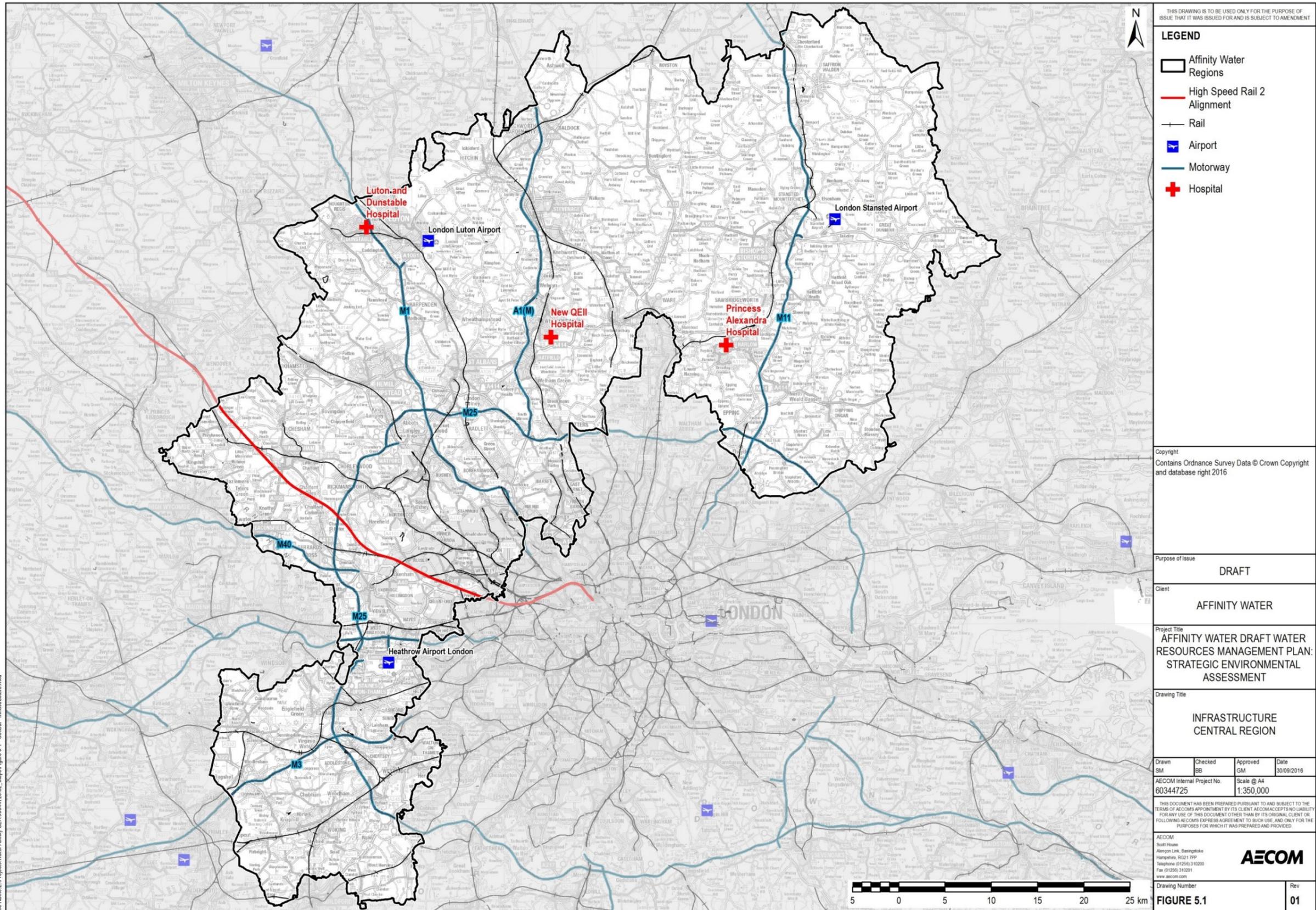
Drawing Number
FIGURE 3.3

Rev
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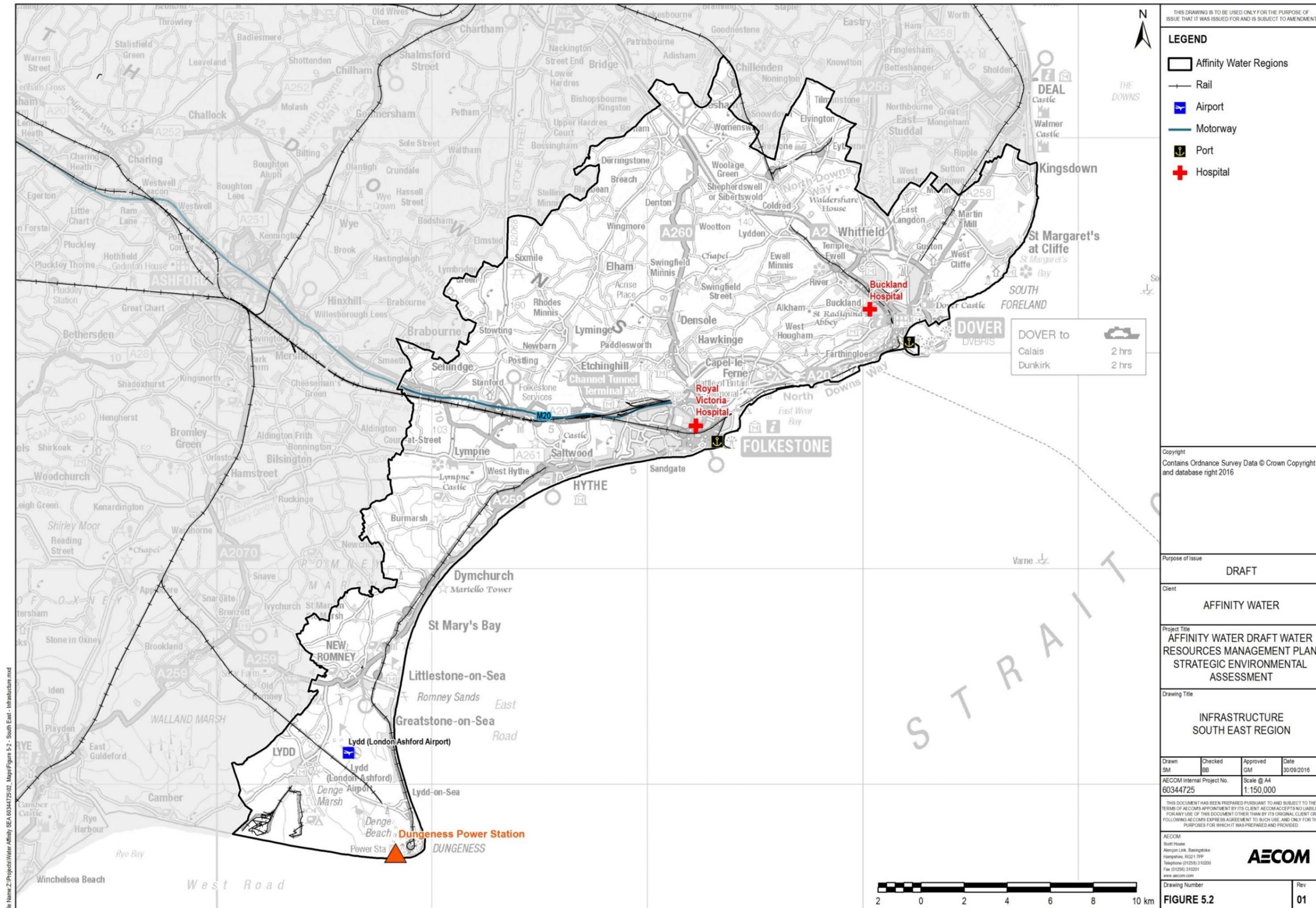
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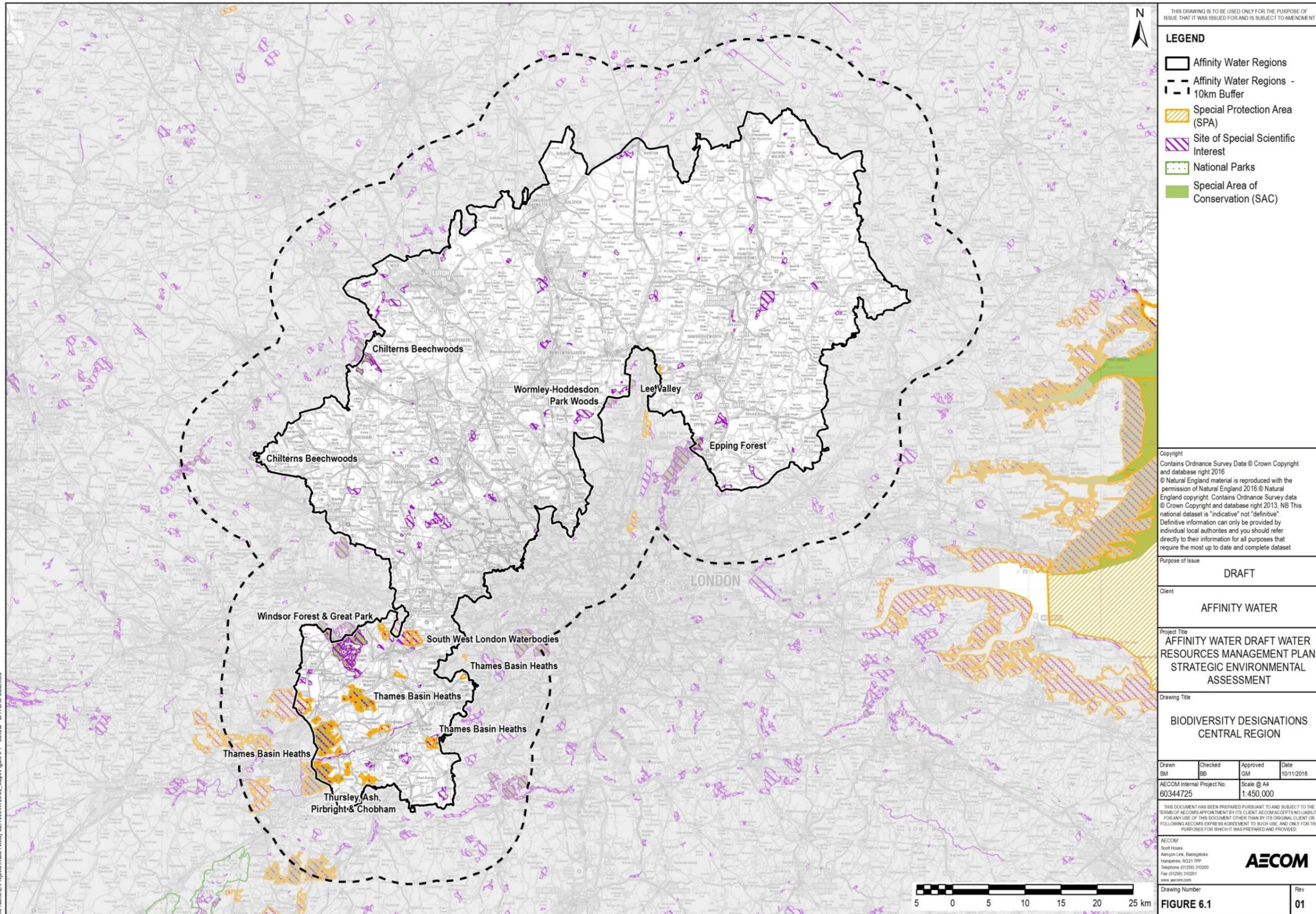
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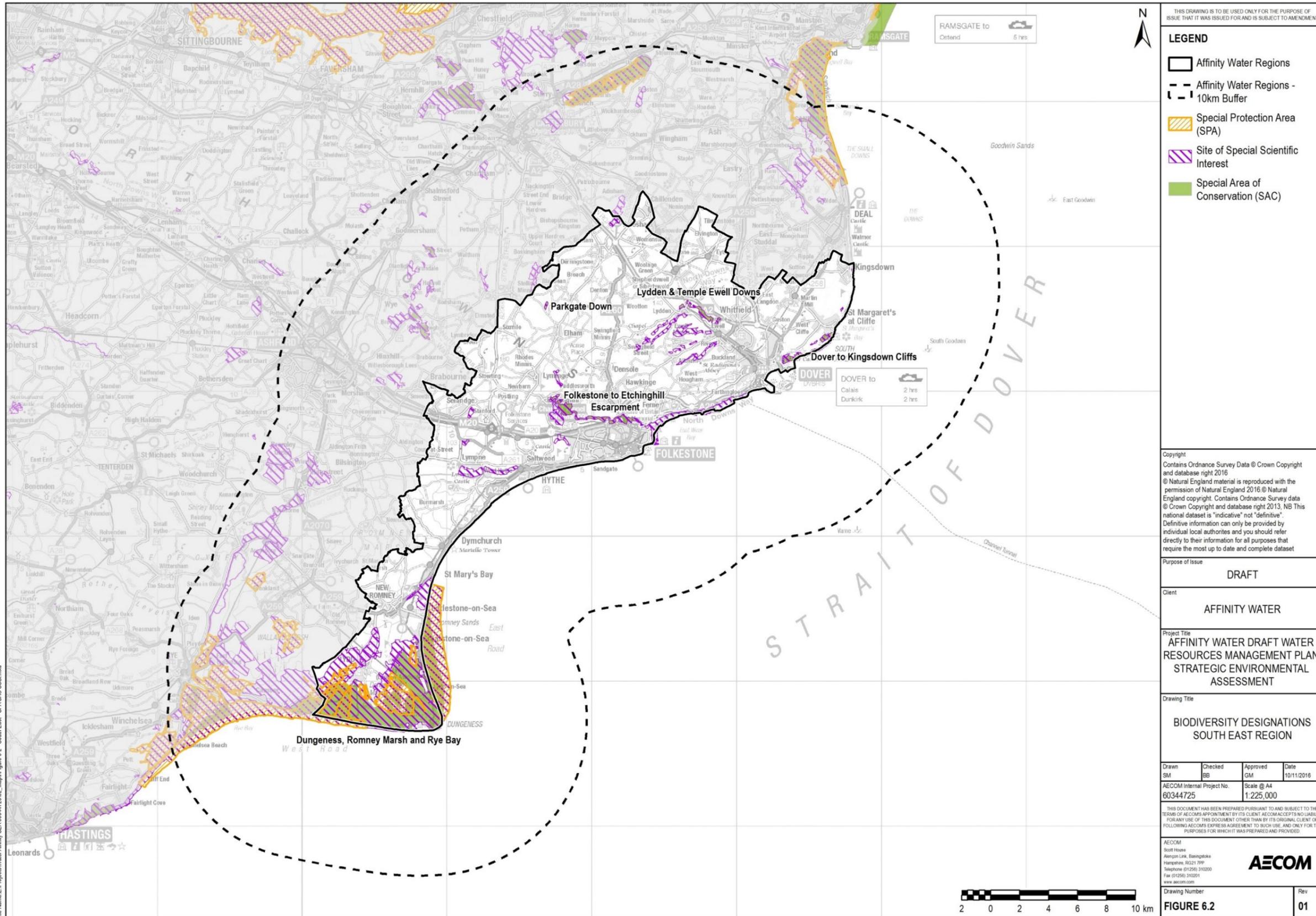
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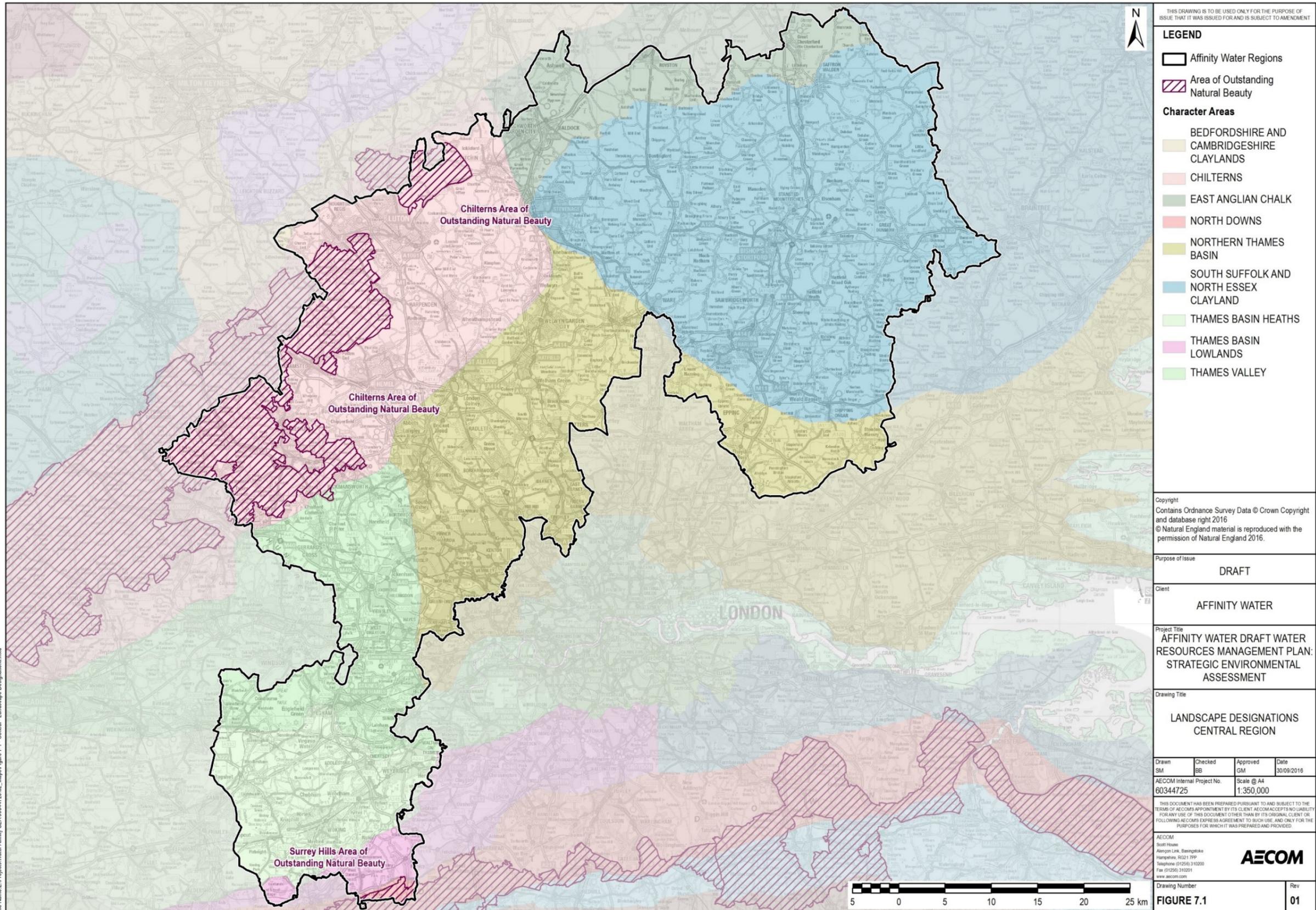
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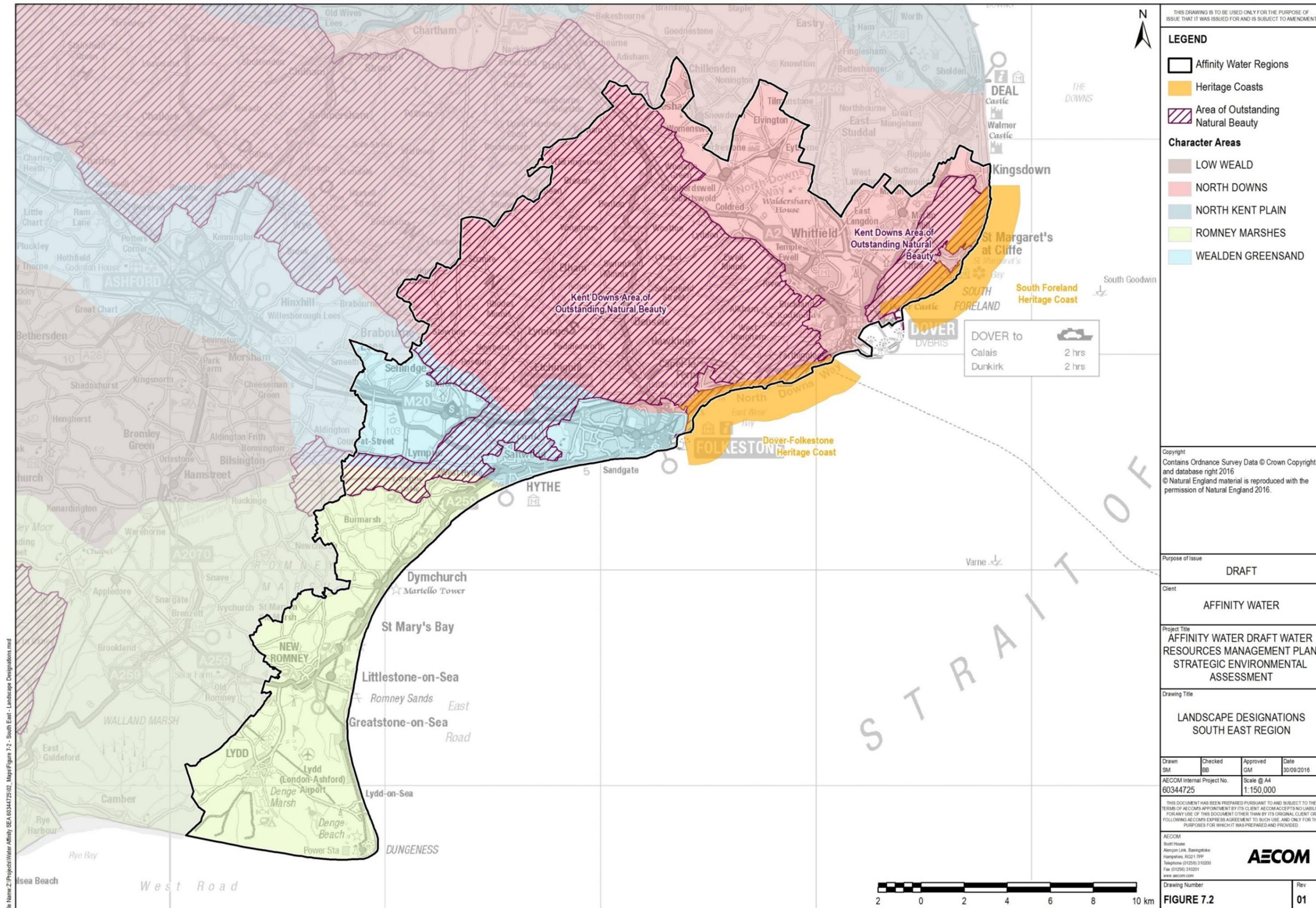
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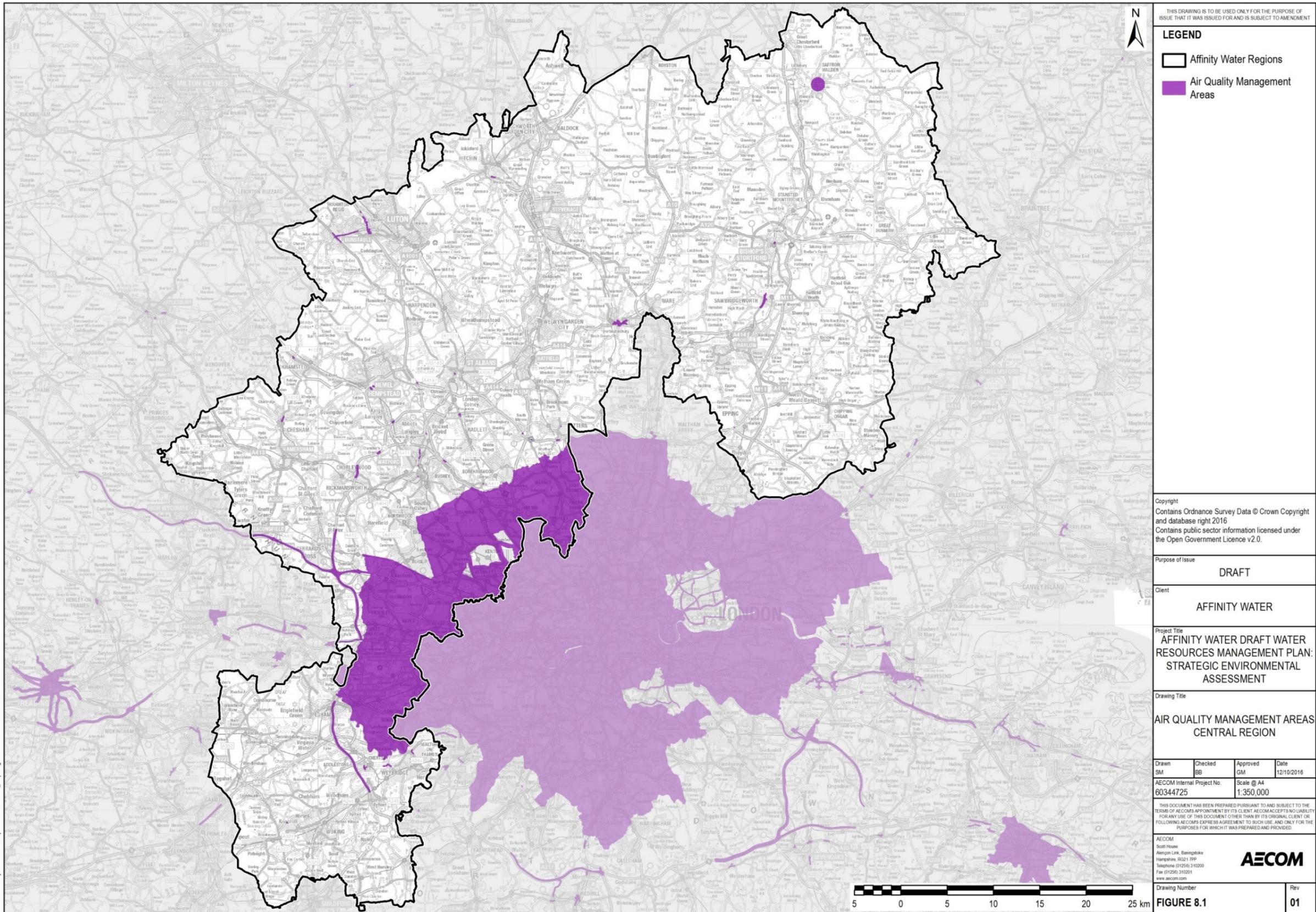
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LEGEND

- Affinity Water Regions
- Air Quality Management Areas

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Purpose of Issue
DRAFT

Client
AFFINITY WATER

Project Title
AFFINITY WATER DRAFT WATER RESOURCES MANAGEMENT PLAN: STRATEGIC ENVIRONMENTAL ASSESSMENT

Drawing Title
AIR QUALITY MANAGEMENT AREAS CENTRAL REGION

Drawn SM	Checked BB	Approved GM	Date 12/10/2016
AECOM Internal Project No. 60344725		Scale @ A4 1:350,000	

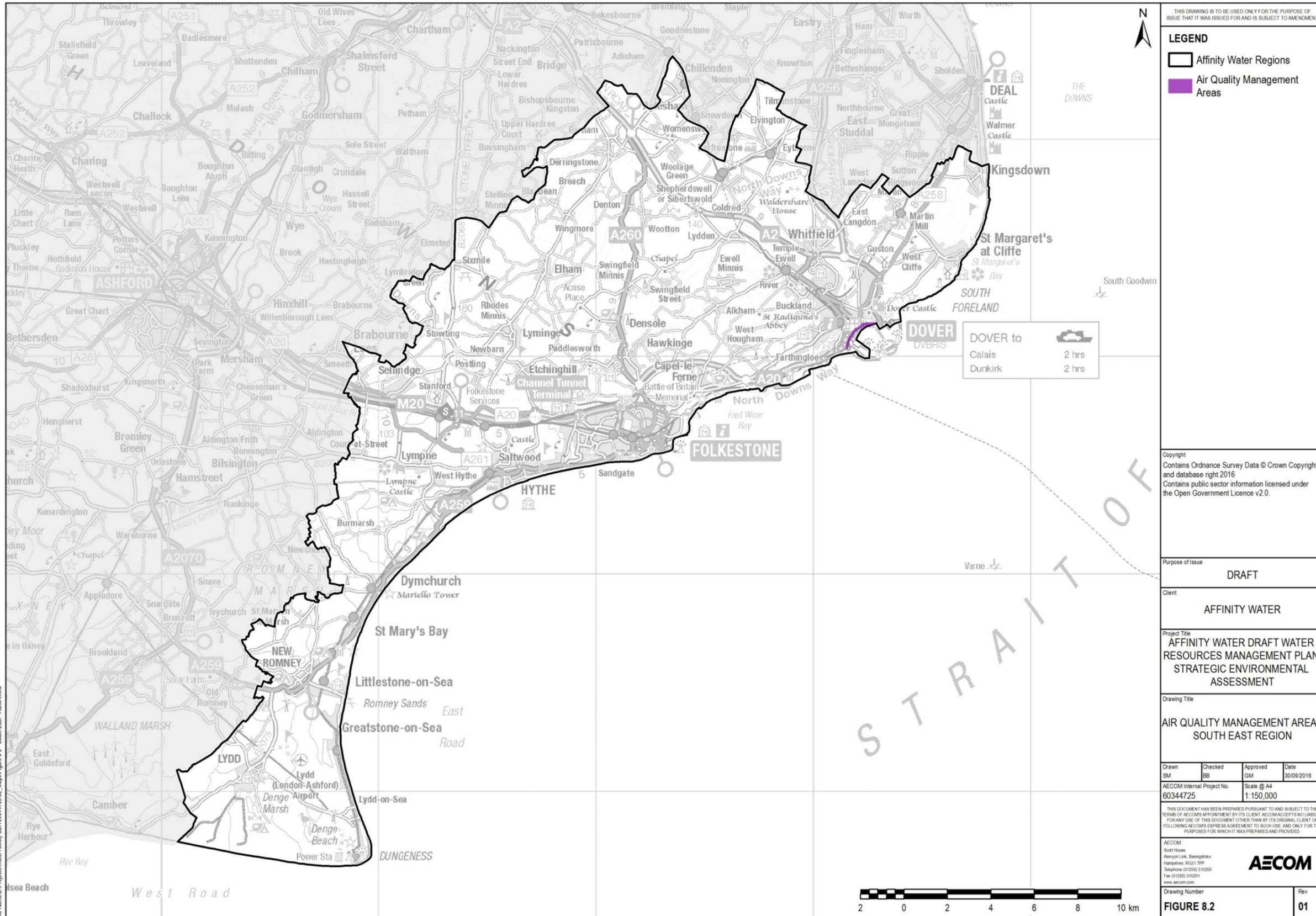
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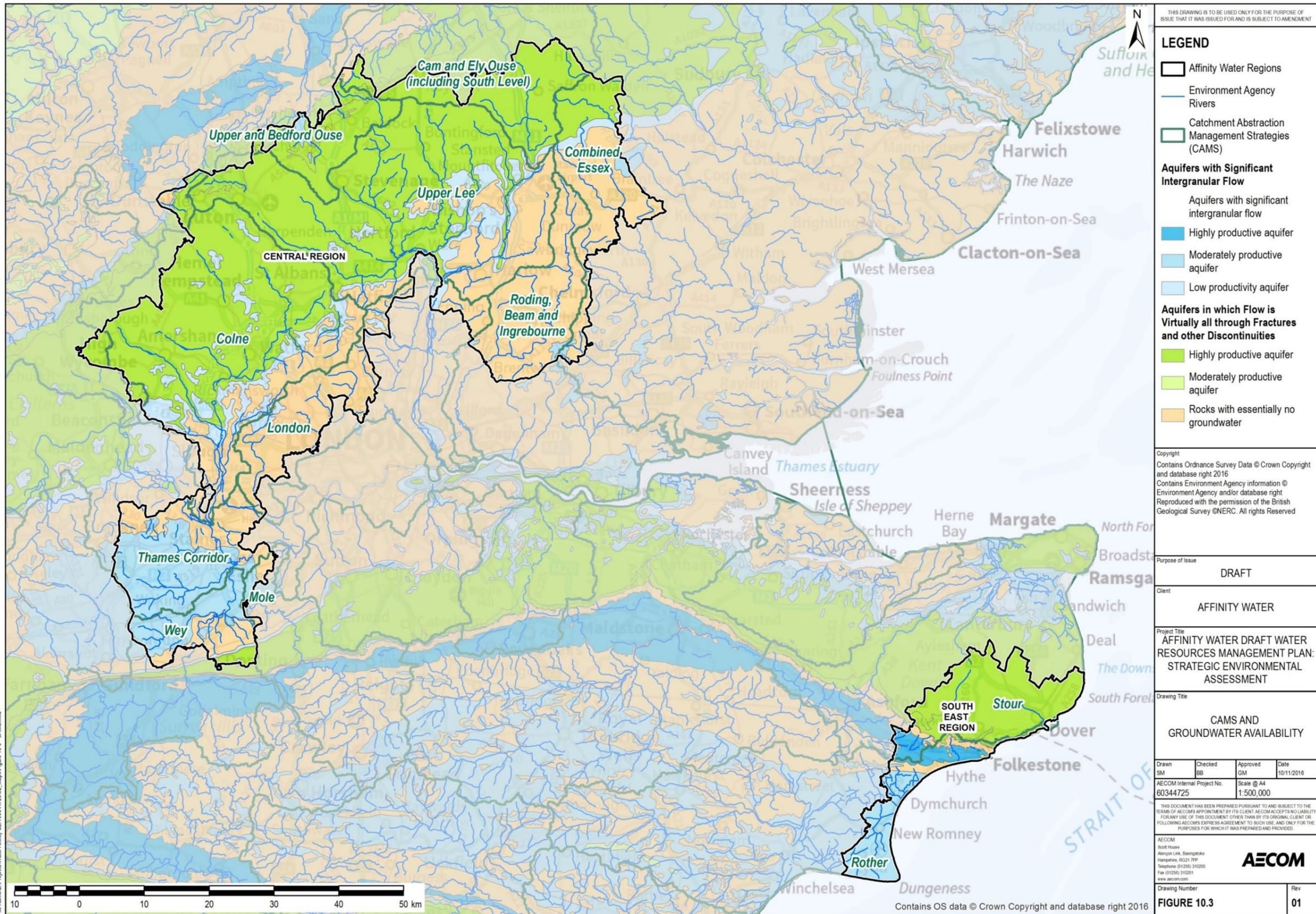
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FIGURE 8.1

Rev
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LEGEND

- Affinity Water Regions
- Environment Agency Rivers
- Catchment Abstraction Management Strategies (CAMS)

Aquifers with Significant Intergranular Flow

- Aquifers with significant intergranular flow
- Highly productive aquifer
- Moderately productive aquifer
- Low productivity aquifer

Aquifers in which Flow is Virtually all through Fractures and other Discontinuities

- Highly productive aquifer
- Moderately productive aquifer
- Rocks with essentially no groundwater

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Purpose of Issue: DRAFT

Client: AFFINITY WATER

Project Title: AFFINITY WATER DRAFT WATER RESOURCES MANAGEMENT PLAN: STRATEGIC ENVIRONMENTAL ASSESSMENT

Drawing Title: CAMS AND GROUNDWATER AVAILABILITY

Drawn SM	Checked BB	Approved GM	Date 10/11/2016
AECOM Internal Project No. 60344725		Scale @ A4 1:500,000	

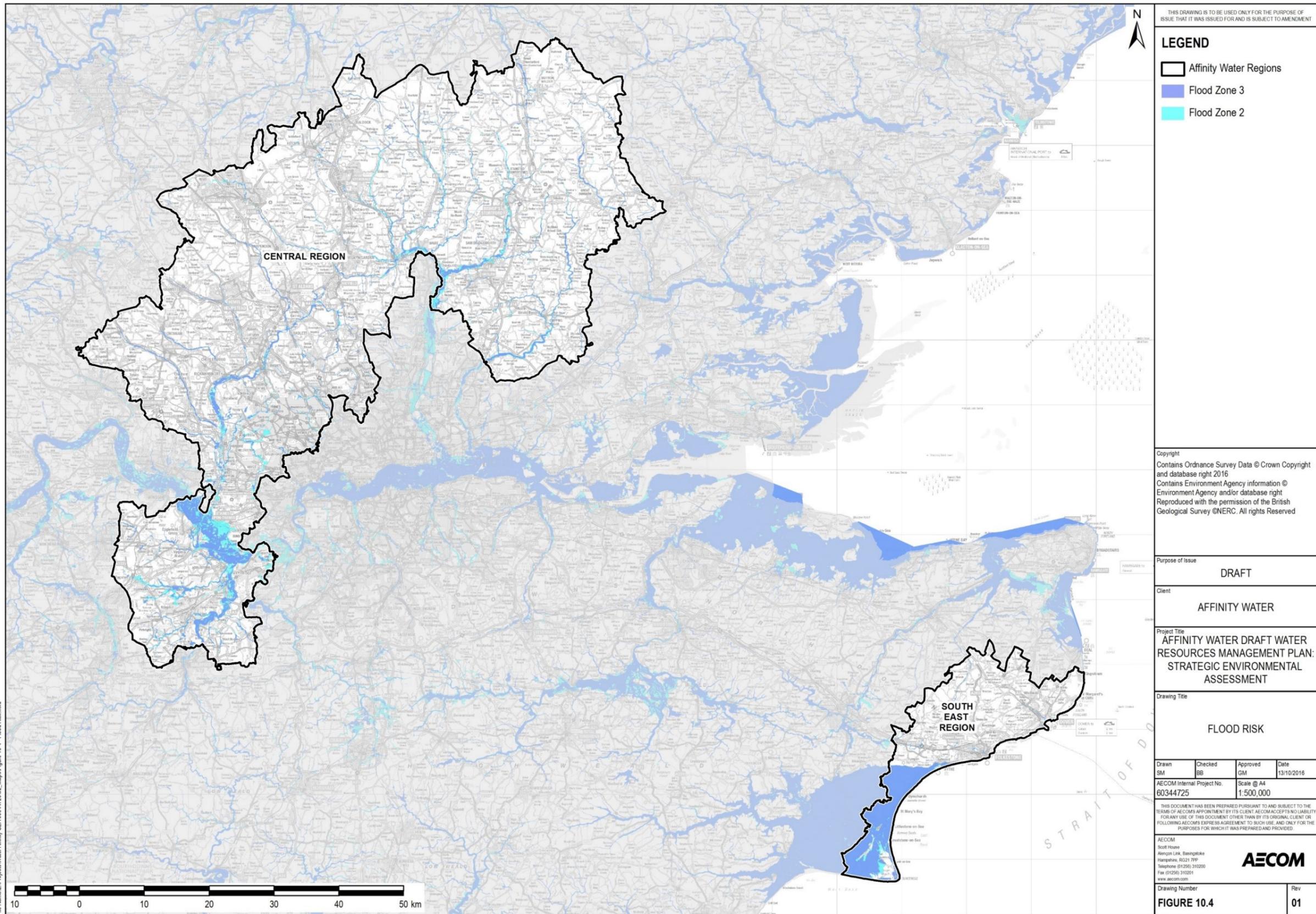
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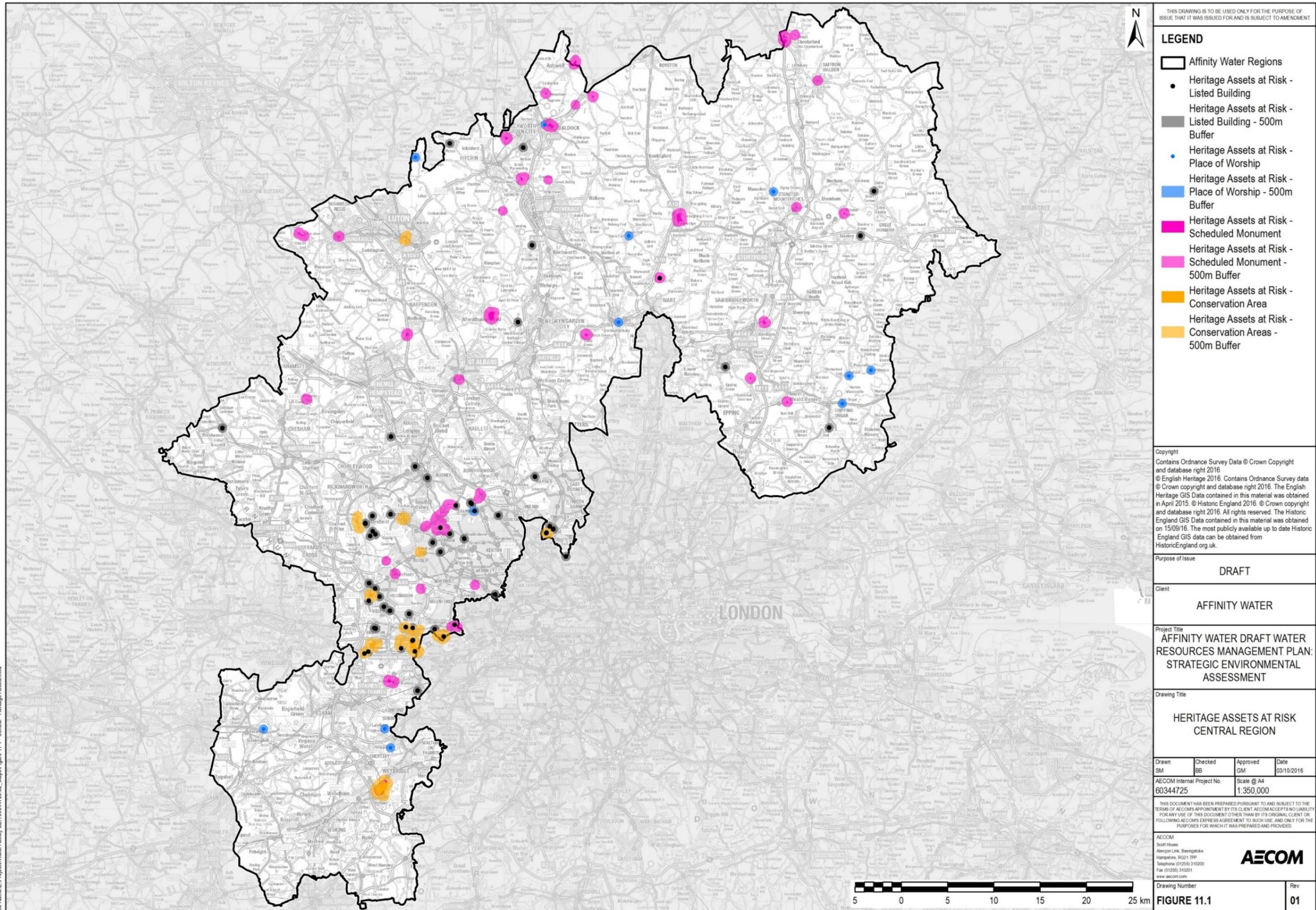
Drawing Number: **FIGURE 10.3** Rev: **01**

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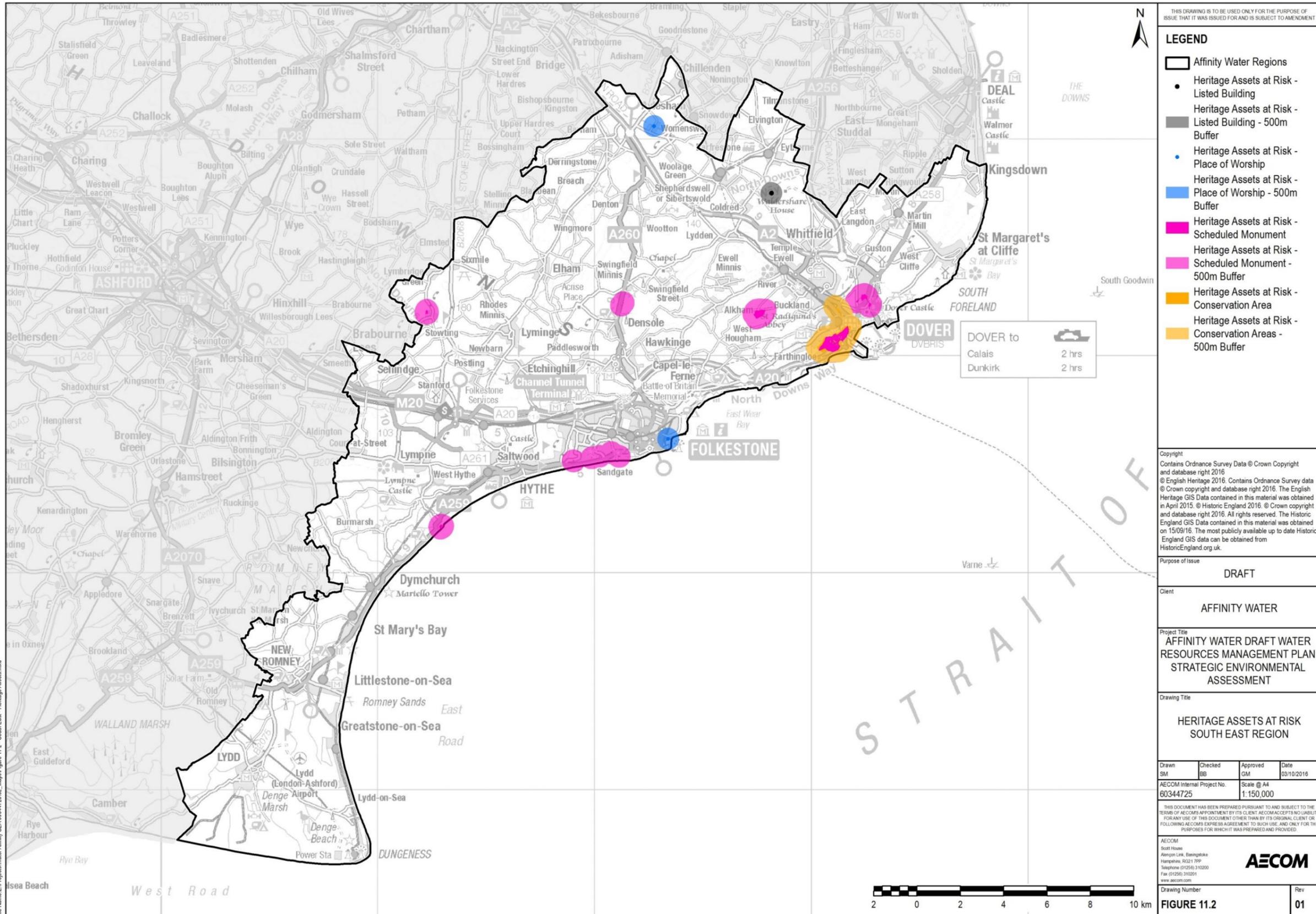
File Name: Z:\Projects\Water Affinity SEA\60344725\2_Maps\Figure 10-3 - CAMS.mxd



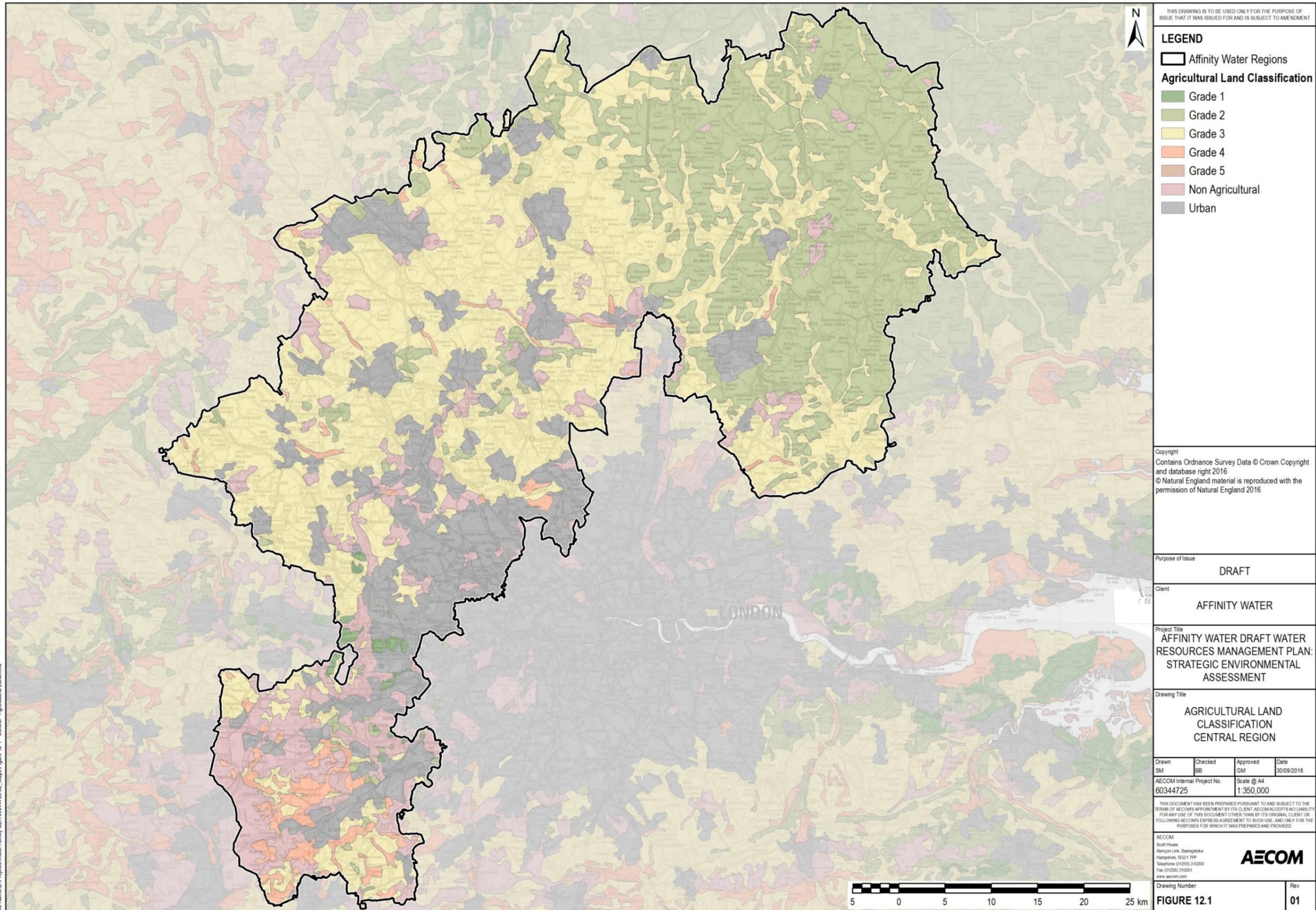
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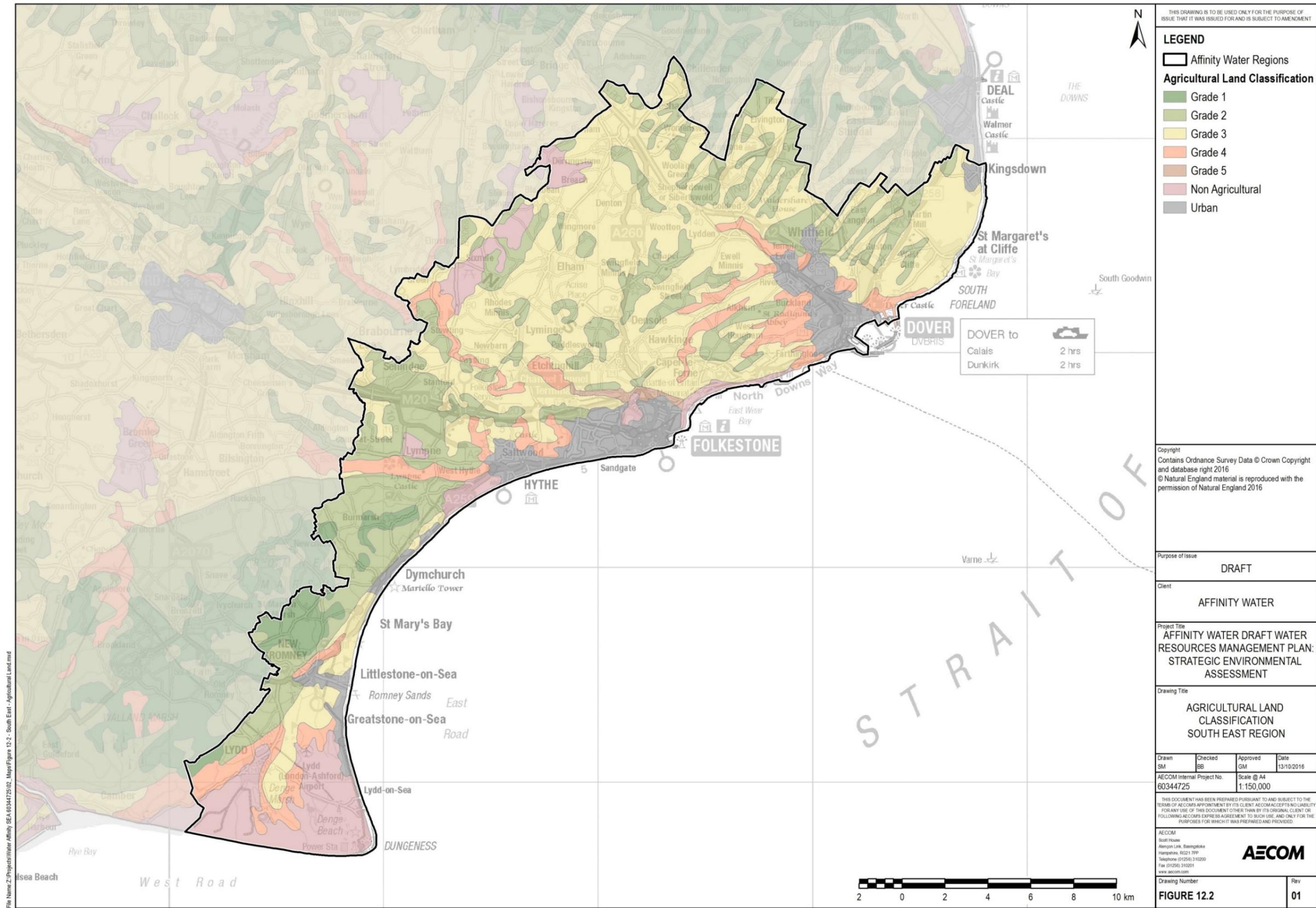


File Name: Z:\Projects\Water Affinity SEA\034472502_Maps\Figure 11.1 - Central - Heritage Assets.mxd



File Name: Z:\Projects\Water Affinity SEA\0344725\02_Maps\Figure 11.2 - South East - Heritage Assets.mxd





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LEGEND

- Affinity Water Regions
- Agricultural Land Classification**
- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Non Agricultural
- Urban

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Purpose of Issue
DRAFT

Client
AFFINITY WATER

Project Title
AFFINITY WATER DRAFT WATER RESOURCES MANAGEMENT PLAN: STRATEGIC ENVIRONMENTAL ASSESSMENT

Drawing Title
AGRICULTURAL LAND CLASSIFICATION SOUTH EAST REGION

Drawn SM	Checked BB	Approved GM	Date 13/10/2016
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Drawing Number FIGURE 12.2	Rev 01
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Appendix III: Statutory consultee responses

Ref	Scoping Report Ref and/ or Question	Comment	Response
Environment Agency			
1	Sets out other plans and programmes and the relationship to the proposed water resource management plan?	<p>The report provides a focused approach to the plan and programme review, identifying key messages rather wading through each plan individually. This has led to a more concise and focused document. The full list of documents reviewed is provided in an appendix. This section could have been further strengthened by identifying the key implications for the WRMP.</p> <p>Area staff also noted the following plans that should be considered in preparing the assessment for the South East operating Area:</p> <p>Kent Environment Strategy and the Kent Downs AONB Management Plan. The SEA also needs to recognise that the RBMP has a number of subsidiary documents. For the Dour these include a Catchment Plan and Water body Improvement Plans (WIPs). The importance of Local Plans and Neighbourhood Plans seem under-played. Mention should also be made of the proposals to expand Dover Port during the plan period and potentially Lydd Airport. Also, the prospect for a 'Garden Village' at Otterpool (Shepway) needs to be considered.</p>	<p>Noted.</p> <p>Noted. These will be added to the plans, programmes and policy review presented in Appendix II.</p>
2	Describes the current state of the environment and how this is likely to evolve in the absence of the plan?	This has been provided.	Noted.
3	Sets out the environmental characteristics of the areas likely to be affected?	In the absence of information of the reasonable alternatives to be considered (see items 11 and 12), the environmental characteristics are described for the two regions included in the scope of the assessment.	Noted.
4	Outlines the current environmental problems that are relevant to the plan with particular reference to the Habitats and Birds Directives.	This has been provided.	Noted.
5	Refers to environmental protection objectives (international, European Community, national level) that are relevant to the plan and sets out how these are to be taken into account?	This has been provided.	Noted.

6	<p>Sets out the methodology to be used to assess the effects of the proposed plan.</p> <p>The methodology for the assessment is clearly set out. However, we have a few clarifications or suggested modifications:</p> <ul style="list-style-type: none"> • Impacts are to be characterised in accordance with their duration and permanence. What is considered to be the difference between these terms? Presumably an impact that has a duration of greater than 25 years would also be considered permanent? • 'Local', 'regional' and 'national' do not really seem to be expressions of the magnitude of the impact. Given the assessment only covers limited regions it seems unlikely that an impact of national magnitude would be even possible. • It might be helpful to include some acknowledgment of uncertainty or confidence in the assessment. At this strategic level it seems unlikely that the assessment will have the level of certainty associated with it that Table 15.1 appears to convey. The methodology for assessing cumulative effects is inadequately explained. Currently we are not clear on the approach or how the significance of cumulative effects is to be determined. 	Noted. This comment has been taken into account within the method set out in the Environmental Report.
7	<p>Where appropriate to the methodology, provides objectives or assessment criteria to be used in the assessment of the environmental effects of the plan.</p> <p>Objectives to be used for the assessment are clearly set out and there is a clear relationship between them and the description of the existing environment and any associated problems.</p> <p>The majority of the objectives are appropriate for a strategic consideration of environmental effects. However, there are some that appear to be more appropriate to a project level consideration. For example, is the WRMP likely to provide sufficient detail to determine whether public rights of way would be severed or whether particular views will be affected?</p>	Noted.
8	<p>Sets out the environmental effects to be assessed by the strategic environmental assessment.</p> <p>The effects to be assessed by the SEA are very clearly stated.</p>	Noted.
9	<p>Defines the spatial scope of the assessment.</p> <p>A rationale for the spatial scope is provided. This includes a 10km buffer zone around each region. It is stated that this was used for the previous WRMP, however the rationale for 10km isn't clear (why not 5km or 15km? Or, why not individually scoped according to the location of actions and the sensitivity of the receiving environment?)</p> <p>"Section 14 Scope – non water dependent sites</p> <p>Flora and Fauna - We disagree that non-water dependent sites should be screened out. A number of options e.g. transfers have the potential to impact on non-water dependent protected sites and species e.g. ancient woodland.</p> <p>Section 6 does not imply that non-water dependent sites should be screened out – a justification for this decision needs to be provided.</p>	<p>Noted. Likely significant effects have been identified using the source, pathway, receptor model to ensure that no sensitive receptors within the influence of the WRMP are missed.</p> <p>Water dependent sites have been included in the SEA scope.</p>

10a	4.3-4	<p>The report states that the SEA for WRMP14 did not identify any significant effects and yet it is scoped into this SEA. It would have been useful to clarify what is likely to have changed between the two plans to cause tourism and recreation to be significant for this plan.</p>	Noted.
10b	Table 5.2	<p>The key issues focuses on the consequence of infrastructure deliver on AW, but it is not clear how the development of WRMP will influence delivery of these projects?</p> <p>An argument was made in section 3.5 to exclude impacts on population as the WRMP is unable to influence population change. Does the same argument not also apply to the above? Would it not be more logical to consider how WRMP decisions could impact/interact with the delivery of these projects and generation of waste?</p>	<p>Noted. The cumulative effects assessment presented in Chapter 6 of the Environmental Report takes interactions with other plans and programmes into account.</p>
10c	6.2-4	<p>Section 6.2</p> <p>Marine Conservation Zones need to be included as some WRMP options may include a marine element i.e. desalination.</p> <p>'Non-designated sites' are mentioned but there is no assessment of Local Wildlife Sites (Formerly Sites of Nature Conservation Importance). It needs to be clarified whether effects to non-statutory designated sites are being scoped in or out.</p> <p>NERC Section 41 habitats and species are mentioned but no baseline information for priority habitats and species is provided. This needs to be provided as one of the assessment questions identified for the SEA is 'Would the options/ programme lead to the loss or degradation of priority habitats or species or lead to the creation of new priority habitats?' This baseline should be drawn from 'best available data' held by Local Biological Records Centres and some Statutory Organisations.</p> <p>There is a mismatch between which designated sites are included in Appendix C, Table 6.3 and Vol2 Figure 6.2. For example; SE region SACs do not appear to be listed in Appendix C.</p> <p>The list of 'main habitat types' is very broad. A baseline list of 'water-related' internationally and nationally protected habitats and species and NERC Section 41 priority habitats and species should ie included in the baseline review.</p> <p>Protected and priority marine habitats and species need to be considered too as some options may impact on the marine environment.</p>	<p>Noted, scoping information presented in Appendix II has been updated to reflect this comment.</p> <p>A proportionate approach has been taking and the best available evidence used.</p>

The list of invasive non-native species (INNS) is incomplete. The scoping report needs to evidence that the baseline is drawn from 'best available data' (held by Local Biological Records Centres and some Statutory Organisations). It should include marine species where options have a marine element. As an example, some species missing from the SE region INNS baseline include Japanese knotweed, zebra mussel, giant hogweed, water fern, Turkish crayfish, pacific oyster & leathery sea squirt.

We would argue the key issue is how the plan affects the spread/movement on non-native species and the consequences for priority flora and fauna rather should be considered.

Section 6.3

There needs to be an assessment of likely new designations during the lifetime of the WRMP. For example, a third tranche of Marine Conservation Zones are currently planned to be designated in 2018.

Section 6.4

There isn't any mention of the Dour or its fish species (important population of brown trout within the context of Kent rivers) in the key issues - only the Thames Estuary is noted.

In general, fish get next to no specific mentions (both in the main document and in Section 15 - Proposed Method). We would like to see fish given extra explicit mention or included into biodiversity.

10d	Table 7.2	One of the objectives refers to impacts on views from public rights of way, designated landscapes, parks or other valued places. At a strategic level this may be difficult to determine as proposed actions may not be sufficiently defined at this stage. It may be more appropriate to consider an objective that addresses the effect on landscape character.	Noted.
10e	8.3-5	We note that this issue has been included in the scope following feedback from Natural England. While there are locations where existing air quality is poor, this plan is only likely to impact on those locations if specific actions are proposed in or near to them. This is an example of where an outline of the alternatives under consideration would have helped to provide an understanding the spatial distribution of impacts. While noise and air quality are likely to be significant for a project level assessment, we are less certain that they are likely to be so at this strategic level. Nevertheless, we acknowledge the desire to respond positively to previous comments from Natural England.	Noted.
10f	Section 9 Table 9.2	A key risk associated with climate change is the impact of increased rainfall intensity and associated flooding events (fluvial/ and surface runoff). The WRMP focusses mainly on the dry-side risks associated with climate change, but the plan could also be affected by changes to flood risk and options in the plan could present risks / opportunities to mitigate flood risks e.g. changes to abstraction regime, catchment and/or channel modification, high flow storage and so on.	Noted, the assessment questions are considered to be appropriate at this stage.

Table 9.2. The third question 'affect the resilience of the local environment and Affinity Water assets to climate change?'

needs to be split in two as the environment and Affinity Water assets can't be considered together.

In addition the second question 'maximise the company's resilience to a changing climate?' would probably be better moved to the SEA objective of 'adapt to climate change' rather than falling under 'minimise the carbon footprint of the company?'

Lastly it might be better to change that last objective to [will the dWRMP2019] adapt to the implications of climate change?

10g	Section 10	<p>Section 10</p> <p>It would strengthen the baseline to also comment on the scale of surface water deficits as well as groundwater status in each CAMS. This would help to make the link between groundwater abstraction and severe groundwater stress and surface water conditions more explicit.</p> <p>Potential additional key issue in table 10.2: Improving resilience, flexibility and sustainability of water resources, particularly with regards to potential climate change impacts on surface water and groundwater.</p> <p>Potential additional assessment questions table 10.2: Will it affect WFD compliance e.g. good ecological potential/status? Will it present a risk to water quality of groundwater and surface water?</p> <p>Section 10.3.1</p> <p>We would argue than in the absence of WRMP19 that there is a significant risk that the objectives of the RBMP will not be achieved as AW's current plan assumed continuation of actions to reduce demand and deliver abstraction reduction up to 2024. These are at risk under a baseline with no PR19 WRMP.</p> <p>Section 10.4</p> <p>Key issues: The failure of many surface waterbodies to achieve good ecological status/potential is also a key issue, as is the requirement to ensure there is no further deterioration in surface or groundwater status.</p> <p>In addition, Affinity Water needs to include assessment of groundwater quality, but has not included it alongside the other entries in Table 14.1 (page 78). The company states it will 'scope in' surface water quality, quantity and flood risk, but hasn't said the same for groundwater. Considering supply zones are predominantly groundwater dependent, this is particularly important.</p>	<p>Noted, these comments have been taken into account where necessary within the updated scoping information presented in Appendix II.</p>
10h	12.5	<p>Geology has been scoped out of the assessment while soil has been scoped in on the basis that construction activities could impact soil. This is likely to be an important consideration at the project level, but we would question whether this is significant at a strategic level and whether it is likely to be material to any decisions to be made.</p>	<p>Noted.</p>

11	<p>The baseline information is sufficient/relevant and up to date to offer an accurate identification of the current state of the environment, and of its evolution without the plan.</p> <p>Sets out reasonable alternatives to be assessed enabling the spatial distribution of environmental effects to be taken into account.</p>	<p>The baseline information is sufficient to provide an understanding of the existing environment and its likely evolution in each of the regions. It provides a generic picture across the regions, but it is likely that this could have been more focused on those locations where impacts are likely to occur had an outline of the reasonable alternatives been included in the report. This would facilitate a greater understanding of the spatial distribution of environmental effects, rather than just their performance against the objectives. Biodiversity, noise and air quality and heritage are all examples of effects for which the scope could have been further refined had there been an understanding of the alternatives being considered.</p>	Noted.
13	General	<p>Given there are previous plans and previous strategic environmental assessments, it would have been helpful to have included a summary of the environmental effects of previous plans. This may have helped to further focus the scope of the assessment on the likely significant effects born from experience.</p>	Noted.
14	General (13)	<p>Ecosystem services appears to be treated as another environmental effect, whereas it overlaps considerably with the more traditional SEA approach. Consideration could have been given to adopting an ecosystem services led approach to the assessment. In the absence of this, it would have been helpful for the document to have provided a fuller explanation of the relationship of the ecosystem services assessment to the SEA.</p>	Noted, the method will be more clearly set out within the Environmental Report.
Natural England			
15a	Biodiversity, flora and fauna section; table 6.1	<p>The following policies, plans and programmes should also be included in the main body of the text in this section:</p> <p>International:</p> <p>Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species.</p> <p>Regulation (EC) No 1100/2007 of 18 September 2007 on establishing measures for the recovery of the stock of European eel.</p> <p>Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on the environmental liability with regard to the prevention and remedying of environmental damage.</p> <p>National:</p> <p>Natural England's standing advice on protected species.</p> <p>The Natural Environment and Rural Communities Act 2006</p> <p>The Wildlife and Countryside Act 1981 (as amended)</p> <p>Regional/local:</p> <p>National Character Area (NCA) profiles as these also concern biodiversity as well as landscape</p>	Noted, scoping information presented in Appendix II has been updated to reflect this comment.

15b	Biodiversity, flora and fauna section; table 6.1	<p>Key messages (Table 6.1)</p> <p>The following should also be included in the key messages:</p> <p>The Habitats Directive and the Wildlife and Countryside Act 1981 (as amended) should be included in the key messages table (table 6.1), as these are very relevant legislation for this section.</p> <p>Reference to priority habitats and species (NERC act S41 for England) should be added to this table.</p>	Noted, scoping information will be updated to reflect this comment and presented in the Environmental Report.
15c	Biodiversity, flora and fauna section; section 6, paragraph 6.2, and appendix C	<p>Review of baseline (Section 6 paragraph 6.2 and Appendix C)</p> <p>Natural England would raise the following issues identified in this section of the report. We would advise making any amendments suggested to ensure your 'Biodiversity, flora and fauna' assessment is adequately covered:</p> <p>While this section references (within Appendix C) the current baseline in terms of the condition of SSSIs (e.g. those in favourable or favourable/recovering condition), it does not discuss the conservation status of the relevant Ramsar sites, SPAs and SACs flagged. The objective for these sites is to maintain or restore favourable conservation status for the habitat and species under the Habitats Directive, and should be included. If the SSSI condition is being used as a site-specific proxy for nationally recorded statistics on Conservation Status this distinction should be clearly set out in the document.</p> <p>Reference to the baseline threats and pressures are not well covered in this section. While damaging issues to water dependant designated sites, such as that from invasive non-native species (paragraphs 6.2.1, 6.2.2) are discussed, there is no commitment to identify the full extent of the baseline pressures/threats that they represent, or how this fits into the dWRMP2019.</p> <p>The high population and development pressure of the Affinity Water Supply area is not referenced as a pressure in the baseline of the biodiversity section. The high levels of anthropogenic influence are of significant to the consideration of water supply in the baseline condition of the environment and therefore its ability to withstand additional pressures from future abstraction and supply activities.</p> <p>We recognise that a climate change chapter has been included as part of this SEA Scoping, however, we would advise also including a metric of allowing wildlife to adapt to climate change in future baseline assessments within the biodiversity section.</p>	Noted, scoping information presented in Appendix II has been updated to reflect this comment.
15d	Biodiversity, flora and fauna section; designated sites and the WRMP Spatial Scope (2.2)	<p>Designated sites and the WRMP Spatial Scope (2.2)</p> <p>In paragraph 2.2 of the Scoping Report the spatial extent of the SEA area is identified, it is stated that this will include "...the Central and Southeast regions, but excludes the East region..." , and that each region will include a 10km buffer assessment area. The adoption of a 10km buffer zone is based on that applied during the previous WRMP2014 SEA iteration. However, consideration must be given to the extent of any new strategic options, which were not elected during WRMP2014, and their cumulative risk to downstream environments beyond this 10km buffer. As such, the SEA must consider the impacts on all new options in relation to the prescribed buffer zone, and work adaptively by expanding this buffer, where required. Especially on potential impacts relating to downstream protected sites. We would advise clarifying that this must be a consideration within latter stages of the dWRMP2019 development in the current SEA Scoping report.</p> <p>In addition to the above, the following is mentioned within paragraph 2.2 of the Scoping Report:</p> <p>"On that basis that no significant effects were likely the East region was excluded from the spatial scope of WRMP2014. The situation has remained the same for dWRMP2019. The scope of this SEA therefore includes the Central and</p>	Noted, a source, pathway, receptor model has been used to identify the likelihood for significant effects to ensure that sensitive receptors within the influence of the WRMP are not overlooked.

Southeast regions, but excludes the East region.”

Natural England do not consider it appropriate to screen out this region of Affinity Water’s operating area at this stage. There are several designated sites and landscapes present within this area that we advise will need specific consideration within the SEA Environmental Report. Resultantly, we would advise that full screening assessments should be undertaken for the sensitive sites in this region within the SEA, alongside the strategic options for the dWRMP20 19, prior to it formally being excluded from further consideration in latter stages. As such, including this region within the scope of the SEA is imperative, in order for Affinity Water to remain compliant with the relevant environmental legislation listed.

Noted. The East region (WRZ 8) has been scoped out of the SEA for the following reasons:
Initial estimates of demand forecasts for East do not trigger deficits within the 25 year statutory period (to 2044) when ARDL is retained within the Deployable Output (DO);

The initial forecasts of demand for East suggest that releasing ARDL will result in a deficit using the baseline estimate, though that is unlikely to occur before 2031;

Demand management options for East will be included within the wider options appraisal, however these are not likely to impact on European sites (e.g. metering, leakage reduction and water efficiency);

Options to support existing operational resilience, and the treatment works at Horsley Cross will

form the initial bases for any resilience works and investment, prior to any new supply source development;

The promotion of options that include new DO would follow 'gap to licence' schemes, and are not included with the feasible option list for WRMP19; and

There are no pathways for potential effects to occur on sensitive receptors in the East region as a result of supply options delivered in the Central and Southeast regions.

15e	Biodiversity, flora and fauna section; Ramsar sites (section 6)	<p>Ramsar sites (Section 6)</p> <p>While most of the relevant Ramsar sites within the Affinity Water operational areas and buffer zones have been acknowledged (excluding those within the Eastern region, see above), we would suggest the following:</p> <p>Both the Lee Valley Ramsar (Central region) and the Dungeness, Romney Marsh and Rye Bay Ramsar (Southeast region), are listed under their associated 'SPAs'.</p> <p>It would be pertinent to separate these. This is since the Lee Valley Ramsar, while sharing the same physical extent as the SPA is notified for features beyond that of the birds at this site (specifically, aquatic macrophytes and invertebrates), and therefore the reasons for notification are not synonymous. This is similarly the case for the Dungeness, Romney Marsh and Rye Bay Ramsar, but unlike that at Lee Valley, the Ramsar here does in fact extend further than its associated SPA delineation. Please note the marine extension to the DRMRB SPA.</p> <p>It is important that these distinctions are identified, to allow for relevant and specific consideration of the pressures exerted on the Ramsar sites and the SPAs, discretely. This is due to the differences in their reasons for notification and physical boundaries.</p> <p>It is mentioned within the scoping report that Ramsar sites are afforded the same level of protection as Natura 2000 sites</p>	<p>Noted, scoping information presented in Appendix II has been updated to reflect this comment.</p>
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(SPAs and SACs). We therefore advise that the above is amended within tables 6.2 and 6.3, respectively, to ensure that the subsequent WRMP2019 SEA and HRA documentation fully reflects this, allowing for the Ramsar sites highlighted to be sufficiently screened.

15f	Biodiversity, flora and fauna section: Marine Conservation Area	<p>Marine Conservation Zones</p> <p>There are a number of proposed and confirmed Marine Conservation Zones (MCZs) present across Affinity Water's operational area and buffer zone, yet none of these have been mentioned within the current Scoping Report.</p>	Noted, scoping information presented in Appendix II has been updated to reflect this comment.
15g	Biodiversity, flora and fauna section: priority habitats and species	<p>Priority habitats and species</p> <p>Natural England note that reference has been made to the importance of priority species and habitats within section 6, table 6.1, of this Scoping report. However, a breakdown of the priority habitats and species throughout the regions of Affinity Water's operational area has not been provided. This would be an advantageous addition to this report, as it would allow for a cross reference between local priority habitats and any relevant upcoming strategic options. We would advise highlighting within the Scoping report, and subsequent SEA documentation, the importance of identifying priority habitats and species, and working to enhance these features as part of Affinity Waters WRMP option creation. We would encourage a focus on the priority habitats and species important to the water environment and diversity of the area. It would be good to include a link to the maps of priority lake and river habitat published by Natural England. It is important that the list of S41 habitats and species to be considered should reflect those most relevant to the supply area.</p>	Noted, a breakdown of priority habitats within the various regions is already provided.
15h		<p>Key issues (6.4)</p> <p>The issues are generally well covered in section 6.4 but could be amended to reflect the following:</p> <p>The need to recognise some of the habitats and species are already stressed due to the extensive anthropogenic pressures of the high and rapidly growing population.</p> <p>The extensive pressure that will be put on the wildlife of the Affinity Water operational area from future changes in climate. We would advise including reference to priority habitats and species (NERC act S41 for England) within the 'key issues' section of chapter 6.</p> <p>Reference to conserving and enhancing protected species should also be made in this table which could be added to the bullet point on coherent ecological networks.</p> <p>The potential for catchment scale impacts and catchment options should also be mentioned here.</p> <p>Paragraph 6.5 refers to the proposed SEA Scope for the WRMP2019, stating that latter SEA documentation will assess the impacts of proposed options/programmes on sensitive sites. We would advise expanding on this, to also identify where positive biodiversity gains can be made, where appropriate, within this WRMP process.</p>	Noted, scoping information presented in Appendix II has been updated where necessary to reflect this comment.
16a	Water section	<p>Regional/local:</p> <p>Any relevant local authority water management plans or strategies (e.g. integrated water management strategy of Hart, Rushmoor and Surrey Heath Borough Council, Surrey County Council's Flood Risk Strategy).</p>	Noted. It is important that the SEA is proportional, cumulative effects with other plans and programmes have

			been considered through the cumulative effects assessment in Chapter 6 of the Environmental Report.
16b	Water; section 10.2	<p>Review of baseline (Section 10.2)</p> <p>It would be worth including the work being carried out by relevant Local Planning Authorities with in the surface water baseline of this section. Specifically looking into Local Plan policies intending to create schemes to enhance local drainage, this would be especially pertinent through flood alleviation strategies and green infrastructure mechanisms, i.e. the development of sustainable drainage within the region. This would allow for a better understanding of how the expanding townscapes within the SEAs scope is handling surface water.</p> <p>It would seem sensible to provide summaries, where available, of the “sustainable catchment” work being undertaken by the Environment Agency. This will give an overview of the baseline position of water resources for different catchments.</p> <p>The need to meet protected area targets for flow and water quality and baseline percentage of protected areas that are currently meeting these standards should be referred to in this section.</p> <p>With regards to the groundwater baseline, it would be relevant to discuss any works being undertaken to enhance or establish local environments to aid in local ground percolation (e.g. the establishment of chalk grasslands through countryside stewardship schemes). This would provide a more holistic view of not only the abstraction pressures through the Affinity Water operational regions, but also the work being undertaken that may be aiding in recharging such aquifers, and highlight areas where more work would be advantageous.</p> <p>Flood risk is addressed within the surface water baseline assessment for this chapter, but not within that for groundwater issues. Clarification should be provided within the groundwater baseline as to whether flooding presents a serious concern within the scope of the WRMP. If not, this should be explained and noted.</p>	Noted, scoping information presented in Appendix II has been updated to reflect this comment.
16c	Water; sections 10.4 and 10.5	<p>Key issues and proposed scope (10.4, 10.5)</p> <p>We would advise including the environmental implications and impacts surrounding surface and ground waters as a key issue in this section, as well as the consequences of climate change.</p> <p>In paragraph 10.5.1, it mentions that surface water will be included within the full SEA, specifically referencing the following: “The assessment will focus on aspects relating to water quality, water quantity and hydro-geomorphology.”</p> <p>We would advise including biodiversity as part of this scope, and discussing the implications of the proposed 10km buffer zone (see paragraph 2.2), specifically looking at any options that may have a hydrological influence beyond this zone and how multi-benefit biodiversity enhancements (e.g. through green infrastructure and sustainable drainage) can be secured.</p> <p>Paragraph 10.5.2 also scopes the groundwater within Affinity Water’s operational area into SEA. Again, with the following being referenced: “ The assessment will focus on impacts to water table levels, saline intrusion, and ground water pollution”</p> <p>In a similar vein to surface waters we would expect the influences surrounding biodiversity to also be scoped into the SEA.</p> <p>When discussing biodiversity, Natural England would expect the SEA to cover both the protected sites and species aspects, as discussed above, and the potential to enhance general biodiversity (including priority species and habitats),</p>	Noted. The interactions between SEA objectives and assessment questions have been considered.

		under the relevant environmental legislation. We consider that options can be created that will be beneficial for both biodiversity enhancement while improving aspects of Affinity Water's delivery (e.g. through improved water quality while meeting biodiversity targets).	
16d	Water; Table 10.2	SEA key questions (Table 10.2) We suggest incorporating the above notes on biodiversity into the SEA key questions.	Noted. The likelihood for significant effects on biodiversity has been explored in detail through the SEA and the HRA.
17a	Landscape, townscape and visual amenity; Table 7.1	Key messages (Table 7.1) The following policies, plans and programmes should also be included in the regional/local list: Landscape Character Assessments (where available)	Noted, scoping information presented in Appendix II has been updated to reflect this comment.
17b	Landscape, townscape and visual amenity: section 7.2	Base line review (Section 7.2) We note that the relevant Areas of Outstanding Natural Beauty (AONB) and National Character Areas (NCAs) for the central and southeast regions of the Affinity Water supply area have been summarised within the baseline review. However, it would also be helpful to note the particular pressures the main NCAs are subject to. Additionally, we advise that the eastern region of Affinity Water's operational area be addressed when considering Landscape, Townscape and visual amenity. This is due to the presence of the Dedham Vale AONB, even if this aspect can be screened out, it must be considered as part of a Landscape and Visual Impact Assessment (LVIA).	Noted, scoping information presented in Appendix II has been updated to reflect this comment.
17c	Landscape, townscape and visual amenity: section 7.5 and table 7.2	SEA Objectives and key questions (7.5 and table 7.2) The proposed objectives should be expanded to include the necessity to assess any potential impacts on designated landscapes through an LVIA. Such an assessment would require identifying any potential risks and mitigation measures required for any options selected in or around a designated landscape.	Noted.
18a	Climate; table 9.1	Key messages (Table 9.1) Paragraph 99 of the NPPF should be included in table 9.1 of this report. This paragraph relates specifically to considering climate change long term, and how this will affect biodiversity. It would be advantageous to incorporate this paragraph to allow for the consideration of the links between biodiversity and climate change resilience and mitigation into the SEA.	Noted, scoping information presented in Appendix II has been updated to reflect this comment.
18b	Climate; section 9.2	Referencing any current schemes looking at green infrastructure and sustainable drainage may be useful here as part of climate change adaptation. This would allow for an understanding of what work is currently being undertaken across the operational area of Affinity Water that may help to build local resilience to the pressures of climate change. It may also be useful to make reference to Natural England's Climate Change Adaptation Manual - Evidence to support	Noted, scoping information presented in Appendix II has been updated to

nature conservation in a changing climate - NE546, to help contextualise these issues.

reflect this comment.

18c	Climate; section 9.4	<p>Key issues (Section 9.4)</p> <p>We note that the key issues highlighted under the climate change chapter refer to the stresses on the area (e.g. from drought and flooding), which will be exacerbated by climate change, and the actions Affinity Water will take to reduce their carbon footprint.</p> <p>Natural England advise also raising the connection between biodiversity and climate change. The SEA Scoping should consider how enhancing climate change resilience through the incorporation/support of biodiversity enhancement may be beneficial to Affinity Water's operational area. Attention should be afforded to how biodiversity enhancement can benefit the water environment throughout Affinity Water's regions (e.g. by creating natural areas of flood storage, river restoration to reduce flow rates, or enhancing available greenspace to promote ground recharge).</p>	<p>Noted, scoping information presented in Appendix II has been updated to reflect this comment.</p>
18d	Climate; section 9.5 and table 9.2	<p>SEA Objectives and key questions (9.5 and table 9.2)</p> <p>We advise including the above points into both the overall objectives for the SEA (9.5), as well as to the key questions table (table 9.2).</p>	<p>Noted. The interactions of SEA Objectives and assessment questions have been explored.</p>
19a	Population and human health; table 3.1	<p>Policies, plans and programmes (Table 3.1)</p> <p>The following policies, plans and programmes should also be included in the regional/local list:</p> <p>Rights of Way Improvement Plans (ROWIPs)</p> <p>Local Authority green infrastructure strategies</p>	<p>Noted, scoping information presented in Appendix II has been updated to reflect this comment.</p>
19b	Population and human health; table 3.4	<p>SEA objectives and key questions (Table 3.4)</p> <p>It may be worth including, within the scope of this section of the SEA, how enhancing green infrastructure can support a healthy environment for people to live in. As such, we would advise considering this within the SEAs scope and key questions. This could extend to the considerations around natural capital included within the SEA.</p>	<p>Noted, scoping information presented in Appendix II has been updated to reflect this comment.</p>
20a	Tourism and recreation; table 3.1	<p>Policies, plans and programmes (Table 3.1)</p> <p>The following policies, plans and programmes should also be included in the regional/local list:</p> <p>Rights of Way Improvement Plans (ROWIPs)</p> <p>Local Authority green infrastructure strategies</p> <p>Including aspects from section 8 of the NPPF which refer to recreation</p>	<p>Noted, scoping information presented in Appendix II has been updated to reflect this comment.</p>
20b	Tourism and recreation; table 4.2	<p>SEA objectives and key questions (Table 4.2)</p> <p>As mentioned under 'population and human health' it would be useful to discuss the potential implications on green</p>	<p>Noted.</p>

		infrastructure promotions within this section.	
21	Material asset and resource use	Natural England has no comments to make on coverage of this SEA topic.	Noted.
22a	Geology and soils; table 12.1	Key messages (Tables 12.1) The first sentence should be expanded to include reference to conservation local geological sites such as Regional Important Geological Sites (RIGS).	Noted, the Defra strategy makes no reference to RIGS.
22b	Geology and soils; section 12.2	Base line review (Section 12.2) Reference to any geological SSSIs would be welcome in this section.	Noted, the scoping considered all SSSIs, including ones designated for geology.
22c	Geology and soils; section 12.4	The first sentence should be expanded to include important local geological sites.	Noted, local geological sites are unlikely to be affected by the issues listed.
22d	Geology and soils; table 12.2	SEA objectives and key questions (Table 12.2) The SEA objective could be expanded to reference the need to prevent soil erosion (which can be greatly exacerbated when normally wet soils are dried).	
23	Air quality and noise; table 8.1	Key messages (Table 8.1) Also relevant to regional/local programmes is the Air Pollution Information System (www.apis.ac.uk). This provides information on air pollution impacts and the sensitivity of different habitats/designated sites.	Noted.
24	Heritage assets and archaeology	Natural England has no comments to make on coverage of this SEA topic.	Noted.
25a	Ecosystem services and the WRMP; section 13	Natural England encourages the inclusion of ecosystem services and natural capital within this SEA scoping.	Noted.
25b	Ecosystem services and the WRMP; section 13.2	Base line review (section 13.2) We note that the baseline review touches on the main habitat types in the Affinity Water operational area, alongside the ecosystem services provided by such and their current status. In addition to this, Natural England requests that the SEA includes an assessment of the potential impacts of the dWRMP2019 on natural capital (including natural processes) and the ecosystem services it supports. This assessment should be caveated alongside tables 13.2 and 13.3.	Noted, Affinity Water and AECOM explored the potential to integrate ecosystem services assessment into the SEA. Please refer to Chapter 5 in the Environmental

			Report for more detail.
25c	Ecosystem services and the WRMP; sections 13.4 and 13.5	<p>SEA Objectives (Sections 13.4 and 13.5)</p> <p>Our natural capital supports the provision of a wide range of ecosystem services, which provide benefits to people in terms of health, wealth and well-being. This includes the provision of water supply. It is stated within the report that the dWRMP2019 has the potential to impact on natural capital and its provision of multiple ecosystem services and we therefore fully welcome the proposed assessment of this impact is included in the SEA, as stated in section 13.5.</p> <p>In this respect we would like to suggest the following:</p> <p>We recommend reference to the UK National Ecosystem Assessment follow-on work on tools, which looks at how SEA can incorporate consideration of ecosystem services/ecosystem approach. Here is the link, it is part of the NEAT Tree toolkit: http://neat.ecosystemsknowledge.net/pdfs/strategic_environmental_assessment_ecosystem_proofed_tool.pdf</p> <p>Impact on ecosystem services needs to take account of impact on the natural capital assets and importantly the ecological processes/functions that underpin the provision of ecosystem services.</p> <p>We recommend that impact is assessed against a broad framework of ecosystem services (e.g. UK National Ecosystem Assessment (UKNEA), or Common International Classification of Ecosystem Services (CICES)) rather than a limited selection of ecosystem services.</p> <p>Due consideration needs to be given to impacts on the cultural ecosystem services, which can often be ignored or down-played in ecosystem service assessment, as they are difficult to quantify. In this respect we suggest the use of a narrative to report the impact on cultural ecosystem services in the assessment.</p> <p>We also recommend reference to our Climate Change Adaptation Manual - Evidence to support nature conservation in a changing climate - NE546 and in particular the chapter on ecosystem services in the main report.</p>	Noted.
26	Summary of the SEA scope; section 14	<p>Summary of the Scope of the SEA (Section 14)</p> <p>Natural England would expect the additions to this SEA Scoping report discussed above be incorporated, where necessary, into the final summary of the scope (table 14.1).</p>	Noted.
27	Proposed method; section 15	<p>Proposed method (Section 15)</p> <p>Natural England is happy with the proposed methods for assessment as set out in the SEA scoping report.</p>	Noted.
28	Table 5.2	<p>Table 15.2</p> <p>The questions within the table should be amended to reflect amendments recommended in the sections above.</p>	Noted.
29	Next steps; section 16	<p>Next steps (Section 16)</p> <p>The iterative process described is welcome.</p> <p>In section 16.2, which discusses the future assessment of the dWRMP2019, Natural England advise including: Developing strategic alternatives, expressly stating that should any negative impacts be identified through the SEA process, that alternative options to those elected will be considered.</p>	Noted.
Historic England			
30	Table 11.1	<p>Key messages from the NPPF should include 'Substantial harm to or loss of a grade II listed building, park or garden should be exceptional, and substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and II* listed buildings, grade I and II* registered parks</p>	Noted, scoping information presented in Appendix II has

and gardens and World Heritage Sites, should be wholly exceptional". The documents should include the Planning (Listed Buildings and Conservation Areas) Act 1990.

been updated to reflect this comment.

31	First paragraph, 11.2.1	We note the reference to our comments on the SEA of the previous WRMP in the first paragraph under 11.2.1. However, there is no reference to a 500m buffer in my letter of 30th November 2012 on the then SEA scoping report for the WRMP 2014 nor any request to focus on Heritage at Risk. A 500m buffer should only ever be considered as a crude initial sift to identify which heritage assets may be affected by an option or options, with a more detailed assessment based on the significance of the asset, the contribution of the setting to that significance (and appreciation of that significance) and the nature of the proposed works to follow. Where location-specific schemes are developed, Historic England will require more detailed assessments of the relevant historic environment to be undertaken.	Noted. It is recognised that distance is not a definitive guide to the likelihood or significance of an impact but it can help in the early stages of assessment to identify options that are within close proximity to sensitive receptors.
32	Figures 11.1 and 11.2	As regards heritage at risk, Historic England does encourage local planning authorities to identify assets on Historic England's Heritage at Risk Register in the Scoping Report for the SEA/SA of their local plans, as the National Planning Policy Framework requires local plans to set out a positive strategy for the conservation and enjoyment of the historic environment, including heritage assets at risk. However, we are not aware that the same requirement applies to Water Resource Management Plans. The Scoping Report should therefore identify all heritage assets in the two areas on Figures 11.1 and 11.2.	Noted, the key designated heritage assets have been identified within the Figures.
33	Sub-section 11.4	Sub-section 11.4 should recognise potential historic assets in floodplains and the vulnerability of those assets to changes in groundwater.	Noted, scoping information presented in Appendix II has been updated to reflect this comment.

Appendix IV: SEA screening criteria

Screening criteria for unconstrained options

Feature	'RAG' rules
• Strategic tourist routes	Intersect or disrupt
• Special areas of conservation (SAC) ⁹⁸	R = <400 m A = 400 m – 5 km G = > 5 km
• Special protection areas (SPA)	R = <400 m A = 400 m – 5 km G = > 5km
• Ramsar sites	R = <400 m A = 400 m – 5 km G = > 5km
• Sites of special scientific interest (SSSI)	R = <500 m or encroaches upon A = 500 – 2000m G = > 2km
• Ancient woodland	R = <500 m or encroaches upon A = 500 – 2000m G = > 2km
• National nature reserves	G = <2km
• County wildlife sites	R = Adjacent to, or encroaches upon A = <400 m
• Local nature reserves	G = <1km
• AONBs	R=<3km from AONB
• AQMAs	R = < 100m from an AQMA A = 100m - 2km from an AQMA G = > 2km
• Flood risk zones	R = Flood risk zone 3 A = Flood risk zone 2 or 2/3 G = Flood risk zone 1
• Groundwater source protection zones	Zone 1 Zone 2 Zone 3
• Nitrate Vulnerable Zone	In Out
• Conservation areas	
• Listed buildings	< 500m
• Scheduled monument	>500m
• Registered Parks and Gardens and Battlefields	
• Agricultural land classification ⁹⁹	R = Grade 1 or 2 A = Grade 3 G = Other / ungraded
• Landfill sites	TBC
• SSSI (geodiversity)	R = <500 m or encroaches upon A = 500 – 2000m G = > 2km
• AONB	R=<3km from AONB

⁹⁸ Note that these distances have been derived from the Thames Basin Heath Avoidance Strategy and is, at this stage, a proxy for proximity impacts on European sites

⁹⁹ Agricultural land is classified into five grades, with grade one being of the best quality. High quality agricultural land is a finite resource, in that it is difficult if not impossible to replace it.

Data assumptions

SEA topic	Feature	Comments
Population, Economy and Human Health	<ul style="list-style-type: none"> Urban areas over 75,000 people 	The proximity of water resource options is unlikely to have a significant effect on population but could affect potential regeneration if there is insufficient water available for further development or distance makes the option unfeasible. The options are unlikely to have a significant impact on the local economy. It should be noted that there is the potential for minor impacts on the population and economy during the construction of any new infrastructure.
Tourism and Recreation	<ul style="list-style-type: none"> Strategic tourist routes 	The proximity of water resource options is unlikely to have a significant effect on tourism and recreation other than through potential disruption during the construction phase.
Material Assets		Limited data is available to inform the assessment. Access to a bus service is important, but the frequency of the service is important and there is no data available that captures this.
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> Special Areas of Conservation (SAC) Special Protection Areas (SPA) Ramsar sites Sites of Special Scientific Interest (SSSI) Ancient Woodland National Nature Reserves County Wildlife Sites Local Nature Reserves 	Good data is available to inform the assessment. It is fair to assume that development in close proximity to sensitive biodiversity sites can lead to impacts. It is recognised that distance in itself is not a definitive guide to the likelihood or significance of effects on designated sites or wider biodiversity. This will be dependent on a variety of information, some of which is not available at this stage, such as the precise scale, type, route, design and layout of new infrastructure as well as level of mitigation to be provided. The specific buffers for SPAs, SACs, Ramsar sites and SSSIs vary between each designated site and can vary across different parts of a designated site. At this stage of the SEA process, the upper limit of the relevant buffer zones have been used in order to assess the sites. This equates to 5 km for SPAs, SACs and Ramsar sites and 2 km for SSSIs.
Landscape, Townscape and Visual Amenity	<ul style="list-style-type: none"> Areas of Outstanding Natural Beauty (AONBs) 	Good data exists to inform the assessment. In terms of mapped spatial data, AONBs and the proximity to them can be accurately determined. As above for biodiversity, it is recognised that distance in itself is not a definitive guide to the likelihood or significance of effects on the landscape. This will be dependent on a variety of information, some of which is not available at this stage, such as the precise scale, type, route, design and layout of new infrastructure as well as level of mitigation to be provided.
Air Quality and Noise	<ul style="list-style-type: none"> Air Quality Management Areas (AQMAs) 	Good data exists to inform the air quality assessment. AQMAs are mapped nationally and the proximity to schemes can be accurately determined. Effects are likely to be temporary i.e. construction phase, other effects due to operation would need to be assessed at the project level through EIA.
Climate	<ul style="list-style-type: none"> Energy consumption 	Limited data is available. The proximity of a source of water to its destination (either households or WTW) can have an implication on the energy required to transport that water.
Surface Water	<ul style="list-style-type: none"> Flood risk zones 	Good data is available to inform the appraisal.
Groundwater	<ul style="list-style-type: none"> Groundwater source protection zones Nitrate Sensitive Area Nitrate Vulnerable Zone 	Good data is available to inform the appraisal.
Cultural Heritage and Archaeology	<ul style="list-style-type: none"> World Heritage Sites Conservation areas Listed buildings Scheduled monument Registered Parks and Gardens and Battlefields 	Good data is available to inform the appraisal, i.e. there is good potential to highlight where development in proximity to a heritage asset might impact negatively on that asset, or its setting. As above for other SEA topics, it is recognised that distance in itself is not a definitive guide to the likelihood or significance of effects on the historic environment. This will be dependent on a variety of information, some of which is not available at this stage, such as the precise scale, type, route, design and layout of new

SEA topic	Feature	Comments
		<p>infrastructure as well as level of mitigation to be provided. Unfortunately, it has not been possible to gather views from heritage specialists on sensitivity of assets / capacity to develop sites. This is a notable limitation as potential for development to conflict with the setting of historic assets / local historic character can only really be considered on a case-by-case basis. It may be the case that development can enhance heritage assets or their setting. Data is also available to show the location of known archaeological sites, although archaeology is rarely a major constraint to development.</p>
Geology and soils	<ul style="list-style-type: none"> • Agricultural land classification¹⁰⁰ • Landfill sites • SSSI (geodiversity) • AONB (were geology is part of the designation) 	<p>Limited data is available to inform the appraisal. There is data to show the location of high quality agricultural land, and agricultural land that has been entered into an Environmental Stewardship scheme. However, it is important to note that the agricultural land quality dataset is of very low resolution. Common land is 'open access' but not necessarily managed with access (including for the young, elderly etc.) in mind.</p>

¹⁰⁰ Agricultural land is classified into five grades, with grade one being of the best quality. High quality agricultural land is a finite resource, in that it is difficult if not impossible to replace it.

Appendix V: SEA of constrained options

1. Transfer Options

1.1 CTR

1.1.1.1 AFF-CTR-WRZ3-0028

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD score	
			Probability		Duration		Permanence					Con	Opp		Operational effect (worst case)	
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option will provide minor positive effects against all objective 1 sub objectives. The pipeline cuts across several major roads including the A40 and M25. There is therefore likely to be temporary major negative effects during construction on the strategic transport infrastructure. However, reinstatement should result in a neutral residual effect during operation. This scheme has the potential to cause the loss of BAP priority habitat deciduous woodland, and the disturbance of BAP priority habitats which will result in a minor negative effect during construction. CEMP may mitigate possible disturbance to sites during operation and will therefore result in a natural residual effect. The pipeline crosses several river channels whose hydro morphology could potentially be impacted, there is therefore likely to be a minor negative effect during operation. Regarding climate change, and minimising Affinity Waters carbon footprint, the expansion of existing works will mean increase in electricity use for construction and operation and result in a minor negative effect during operation and a moderate negative effect during construction. However, by upgrading the storage capacity this option should result in moderate positive effects on the resilience of Affinity Water's assets to climate change.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 15MI/d equates to a minor positive effect.	1		
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			1	
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			1	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	This option will provide minor positive effects against all objective 1 sub objectives. The pipeline cuts across several major roads including the A40 and M25. There is therefore likely to be temporary major negative effects during construction on the strategic transport infrastructure. However, reinstatement should result in a neutral residual effect during operation. This scheme has the potential to cause the loss of BAP priority habitat deciduous woodland, and the disturbance of BAP priority habitats which will result in a minor negative effect during construction. CEMP may mitigate possible disturbance to sites during operation and will therefore result in a natural residual effect. The pipeline crosses several river channels whose hydro morphology could potentially be impacted, there is therefore likely to be a minor negative effect during operation. Regarding climate change, and minimising Affinity Waters carbon footprint, the expansion of existing works will mean increase in electricity use for construction and operation and result in a minor negative effect during operation and a moderate negative effect during construction. However, by upgrading the storage capacity this option should result in moderate positive effects on the resilience of Affinity Water's assets to climate change.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0		
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		The upgrade to the pipeline follows the route of existing roads, and so no accessible informal recreation sites are anticipated to be affected during construction or operation.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0		The option requires upgrade of the existing main between Willow bank and New Year's Green from a 600mm diameter main to a 800mm diameter main (approximately 5.1km in length). A new pipeline of this length is likely to sever sections of public rights of way and other amenity assets. This has the potential for a temporary short term minor negative effect.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	This option will provide minor positive effects against all objective 1 sub objectives. The pipeline cuts across several major roads including the A40 and M25. There is therefore likely to be temporary major negative effects during construction on the strategic transport infrastructure. However, reinstatement should result in a neutral residual effect during operation. This scheme has the potential to cause the loss of BAP priority habitat deciduous woodland, and the disturbance of BAP priority habitats which will result in a minor negative effect during construction. CEMP may mitigate possible disturbance to sites during operation and will therefore result in a natural residual effect. The pipeline crosses several river channels whose hydro morphology could potentially be impacted, there is therefore likely to be a minor negative effect during operation. Regarding climate change, and minimising Affinity Waters carbon footprint, the expansion of existing works will mean increase in electricity use for construction and operation and result in a minor negative effect during operation and a moderate negative effect during construction. However, by upgrading the storage capacity this option should result in moderate positive effects on the resilience of Affinity Water's assets to climate change.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Regional	High	N/A	-3	0	The option requires upgrade of the existing main between Willow bank and New Year's Green from a 600mm diameter main to a 800mm diameter main (approximately 5.1km in length). The pipeline cuts across several major roads including the A40 and M25. There is likely to be significant temporary negative effects during construction.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.		

4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-3	0	The option requires upgrades of the HWFS Treatment Works Booster Pumps (5 x 355kW), upgrade of the existing main between Willowbank and New Year's Green from a 600mm diameter main to an 800mm diameter main (approximately 5.1km in length), upgrade of booster pumps at ICKE (5 x 500kW) and a 15MI upgrade to ARKR capacity.	0
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No European sites are affected by this option.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	?	Long term >25 years	?	Permanent	?	Local	Low	CEMP may mitigate possible disturbance to sites. Potential loss of deciduous woodland could be mitigated with slight change in pipe position. If loss cannot be avoided, compensatory habitat will be required.	-1	0	This scheme has the potential to cause the loss of BAP priority habitat deciduous woodland, and the disturbance of BAP priority habitats deciduous woodland, semi-improved grassland and coastal or floodplain grazing marsh during construction, and potentially change the hydrology of these sites. The scheme has the potential to disturb several parcels of ancient woodland during construction, and depending on the depth of the pipeline, change the hydrology of these sites. The scheme also crosses several watercourses. Ecological and WFD assessment will be required.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	Ecological survey required	?	?	No invasive species identified, however detailed ecological survey would be required	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	High	?	Medium term (5 -25 years)	?	Temporary	?	Regional	Moderate	CEMP may mitigate possible disturbance to sites.	-1	0	Pipe passes adjacent to Fray's Farm Meadows SSSI, and Frays Valley LNR. Pipeline passes adjacent to Ruislip Woods SSSI and NNR (Ancient semi natural woodland priority habitat), 300m from Whippendell Wood SSSI and 35m from Bricket Wood Common SSSI (deciduous woodland). Pipeline passes adjacent to Water End Swallow Holes SSSI. The scheme has the potential to lead to the disturbance of at least five SSSIs during construction. The scheme also has the potential to lead to changes in hydrology at these designated sites, depending on the depth of the pipeline.	0
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and landscape character assessments should be carried out where significant infrastructure works will be carried out.	-1	0	The pipeline runs through Stanley Country Park and construction may have a negative effect on the landscape setting and character. However, once re-instated the likely residual effect will be neutral	0

	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality. However, it is noted that the pipeline route passes within the Hillingdon AQMA. There are likely to be negative effects on air quality during construction of the new pipeline as a result of increased traffic.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Medium	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-1	Expansion of existing works will mean increase in electricity use for construction and operation.	-1
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of Affinity Water's assets to climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of Affinity Water's assets to climate change.	2
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - transfer only	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No abstraction dealt with in this scheme, transfer only.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact/effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No abstraction dealt with in this scheme, transfer only.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water runoff.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full reinstatement of any land affected by construction.	-1	0	The new pipeline route passes within 10m of a number of Listed Buildings and a Registered Park and Garden. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected is anticipated to result in negative effects on the historic environment that are short-term, temporary and not experienced during the operational phase.	0

	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.1.1.2 AFF-CTR-WRZ3-0349

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD score
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option will provide minor positive effects against all objective 1 sub objectives. There will be minor negative construction phase effects on strategic transport infrastructure and on public rights of way associated with this option. There is potential for habitat loss of BAP Priority habitat deciduous woodland and therefore minor negative effects on biodiversity during construction and operation. By upgrading the transfer capacity this option should result in positive effects on the resilience of the local environment and Affinity Water's assets to climate change. However, the pipeline crosses several river channels whose hydro morphology could potentially be impacted. Consequently, there will be minor negative effects on surface water bodies.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 15MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	This option will provide minor positive effects against all objective 1 sub objectives. There will be minor negative construction phase effects on strategic transport infrastructure and on public rights of way associated with this option. There is potential for habitat loss of BAP Priority habitat deciduous woodland and therefore minor negative effects on biodiversity during construction and operation. By upgrading the transfer capacity this option should result in positive effects on the resilience of the local environment and Affinity Water's assets to climate change. However, the pipeline crosses several river channels whose hydro morphology could potentially be impacted. Consequently, there will be minor negative effects on surface water bodies.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option requires a new 6.47 km main (400mm) from BUGR to SACO. A new pipeline of this length is likely to sever sections of public rights of way and other amenity assets. This has the potential for a temporary short term minor negative effect.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	This option will provide minor positive effects against all objective 1 sub objectives. There will be minor negative construction phase effects on strategic transport infrastructure and on public rights of way associated with this option. There is potential for habitat loss of BAP Priority habitat deciduous woodland and therefore minor negative effects on biodiversity during construction and operation. By upgrading the transfer capacity this option should result in positive effects on the resilience of the local environment and Affinity Water's assets to climate change. However, the pipeline crosses several river channels whose hydro morphology could potentially be impacted. Consequently, there will be minor negative effects on surface water bodies.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The construction traffic impact is not anticipated to be a significant impact for a longer duration than a few months (at any one location). No significant operation impacts are anticipated.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	This option will provide minor positive effects against all objective 1 sub objectives. There will be minor negative construction phase effects on strategic transport infrastructure and on public rights of way associated with this option. There is potential for habitat loss of BAP Priority habitat deciduous woodland and therefore minor negative effects on biodiversity during construction and operation. By upgrading the transfer capacity this option should result in positive effects on the resilience of the local environment and Affinity Water's assets to climate change. However, the pipeline crosses several river channels whose hydro morphology could potentially be impacted. Consequently, there will be minor negative effects on surface water bodies.	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	-1	The option requires a new 6.47 km main (400mm) from BUGR to SACO.	-1
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	National	High	None identified	0	0	The proposed transfer route is located 10km from Wormley-Hoddesdonpark Woods Special Area of Conservation (SAC). If increased abstraction required to support this option under another scheme/option, in combination HRA may be required.	-1
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Low	The loss of BAP Priority habitat should be avoided where possible; if not possible, compensatory habitat will be required. A CEMP should be in place during construction. Ecology surveys will be required of terrestrial and aquatic habitats.	-1	-1	The proposed transfer pipe passes through Back Lane County Wildlife Site (CWS) and SACO Park CWS. SACO Park Tank Service Reservoir is also within SACO Park CWS. The pipeline route also passes through BAP Priority habitat deciduous woodland at BUGR and adjacent to the River Beane. The pipeline route passes through the River Beane and the River Beane from Waterford Hall to Mill End CWS and through Stapleford Marsh Ditch which is also a CWS. The pipeline also intersects a stream at Stony hills Road Wood Ware Lodge South CWS. The pipeline route passes adjacent to Bramfields Woods CWS and Martin Spring CWS. Potential for habitat loss of BAP Priority habitat deciduous woodland, Back Lane CWS and Stapleford Marsh Ditch CWS. Loss of BAP Priority habitat should be avoided where possible. Depending on depth of pipeline, potential for changes to hydrology to CWS, ancient woodland and BAP Priority habitats. Also potential for noise, light and dust disturbance during construction. Potential for protected species to be affected. Potential impacts to species within BAP Priority woodland habitats to be impacted during construction. Potential impacts to aquatic species in waterbodies to be impacted during construction and operation. Detailed ecological survey required.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	A CEMP should be in place during construction.	0	0	The pipeline route is within 3.5km of Twinbury Site of Special Scientific Interest (SSSI) which is designated for its swamp communities with open water and wet woodland. No effects on this SSSI have been identified.	

		?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
	5.e. Provide opportunities for biodiversity enhancement?													
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and Landscape character assessments should be carried out where significant infrastructure works will be undertaken.	-1	0	There are likely to be minor negative effects on landscape during construction phase. Mitigation measures such as reinstatement of affected land will reduce the residual effect during operational phase.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?										-1	0	There will be increased energy use associated with the construction of the main, although no increase in operational energy use.	
	8.b. Maximise the company's resilience to a changing climate?										0	1	Predicted climatic changes in England include hotter and drier summers. By upgrading the transfer capacity this option should result in positive effects on the resilience of Affinity Water's assets to climate change.	0
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?										0	1	Predicted climatic changes in England include hotter and drier summers. By upgrading the transfer capacity this option should result in positive effects on the resilience of the local environment and Affinity Water's assets to climate change.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Treatment not dealt with in this scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact/effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	0

12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water runoff.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full reinstatement of any land affected by construction.	-1	0	The pipeline route passes within 15m of the Woodhall Registered Park and Garden and a Listed Building. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

1.1.1.3 AFF-CTR-WRZ3-0707

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option will provide minor positive effects against all objective 1 sub objectives. The pipeline cuts across several major roads. As such there is likely to be moderate temporary negative effects on strategic transport infrastructure and minor negative effects on public rights of way during construction. The pipeline passes adjacent to several parcels of BAP Priority habitat deciduous woodland and good quality semi-improved grassland. Additionally, the new reservoir location is potentially adjacent to BAP Priority habitat deciduous woodland. This may result in negative effects on biodiversity during construction phase. The new pipeline route also runs through the Minet country park, and as such, there are likely to be moderate negative short term effects on landscape during construction. However, once reinstated the likely residual effect will be neutral. Construction and operation phase activities are likely to increase Affinity Water's carbon footprint. They will therefore result in moderate	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 15MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	This option will provide minor positive effects against all objective 1 sub objectives. The pipeline cuts across several major roads. As such there is likely to be moderate temporary negative effects on strategic transport infrastructure and minor negative effects on public rights of way during construction. The pipeline passes adjacent to several parcels of BAP Priority habitat deciduous woodland and good quality semi-improved grassland. Additionally, the new reservoir location is potentially adjacent to BAP Priority habitat deciduous woodland. This may result in negative effects on biodiversity during construction phase. The new pipeline route also runs through the Minet country park, and as such, there are likely to be moderate negative short term effects on landscape during construction. However, once reinstated the likely residual effect will be neutral. Construction and operation phase activities are likely to increase Affinity Water's carbon footprint. They will therefore result in moderate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		Medium	N/A	Low	N/A	Low	N/A	Local	Moderate	N/A	0	0	It is anticipated that there is potential for disturbance to water quality during construction work, if the pipeline does not use existing bridges or gantries. This may result in short term, temporary negative effects on recreation activities such as fishing. No operational impacts are anticipated.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option will require 31.8km of 700mm diameter main to be installed from HWFS Treatment Works to ARKL. A new pipeline of this length is likely to sever sections of public rights of way and other amenity assets. This has the potential for a temporary short term minor negative effect.	

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	negative effects on climate change. The pipeline crosses several river channels whose hydro morphology could potentially be impacted. Further abstraction may have a negative effect on the environment if not properly monitored and licensed. There is therefore predicated to be minor negative effects during operation on climate change adaption and on surface water bodies. The pipeline passes within 5m of the Registered Cannons Park, and within 20m of a number of Listed Buildings. There is therefore likely to be moderate negative effects on the historic environment during construction. The pipeline route also crosses grade 1 agricultural land, therefore moderate negative effects are expected during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Regional	High	N/A	-2	0	The option will require 31.8km of 700mm diameter main to be installed from HWFS Treatment Works to ARKL. The pipeline cuts across several major roads including the A4020, A408, A311, A317 and A312. There is likely to be significant temporary negative effects during construction.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-3	0	This option will require 31.8km of 700mm diameter main to be installed from HWFS Treatment Works to ARKL, booster pump upgrades at HWFS Treatment Works (5 x 200kW), Stanmore Pump Station (4 x 132kW) and New ARKL (4 x 45kW). ARKL will be required to be upgraded by 40MI.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	?
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		Low	?	Medium term (5 -25 years)	?	Temporary	?	Local	Low	CEMP should be put in place to mitigate disturbance to Priority habitats. Ecological surveys required.	-1	0	Pipeline passes adjacent to several parcels of BAP Priority habitat deciduous woodland and good quality semi-improved grassland. Pipeline crosses fields with potential for hedgerow severance at Harrow School Farm, also crosses a drain in this location. The new reservoir location within this area may also affect these habitats, and is potentially adjacent to BAP Priority habitat deciduous woodland. The new reservoir may affect the hydrology of this location. Pipeline crosses several watercourses. WFD input required.	
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	Unknown - ecological survey required	?	?	Unknown if invasive species are present within land required for works.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.e. Provide opportunities for biodiversity enhancement?		?	?	?	?	?	?	?	?	Potential for enhancements such as planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and landscape character assessments should be carried out where significant infrastructure works will be carried out.	-2	0	The option requires 31.8 km of new 700mm Main from HWFS Treatment Works to ARKL, and creation of the ARKL. It is also requires a new pumping station at Stanmore, which is assumed will be visible during operation. Once reinstatement has been carried out the new pipeline and covered reservoir will not be visible. Upgrades to pumping stations will not significantly alter infrastructure which is already present. The new pipeline route runs through the Minet country park. As such, there are likely to be significant negative short term effects during construction. However, once re-instated the likely residual effect will be neutral.	0

	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality given the presence of the M1 and other major roads in the vicinity of the option. However, it is noted that the site is within the Hillingdon AQMA.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-2	Construction and operation phase activities are likely to increase Affinity Water's carbon footprint.	-2
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. There is potential for loss of BAP habitat area during construction.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Treatment not dealt with in this scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt in this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact/effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-2	0	The pipeline passes within 5m of the Registered Cannons Park, and within 20m of a number of Listed Buildings. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0

	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-2	0	The pipeline route crosses grade 1 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0	

1.1.1.4 AFF-CTR-WRZ4-0716

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The pipeline cuts across several major roads and will result in moderate negative effects on the strategic transport infrastructure, and also minor negative effects on public rights of way during construction. There is also predicted to be minor negative effects during both construction and operation on biodiversity as the pipeline passes through the Staines Moor SSSI and due to the proximity of the South West London Waterbodies SPA and adjacent BAP priority habitats. Construction activities are likely to increase Affinity Water's carbon footprint resulting in minor negative effects during both construction and operation. Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. Consequently there is likely to be minor negative effects during construction and operation with regard to surface water bodies and the local environments resilience to climate change. The new pipeline route passes within close proximity to Listed Buildings and a Scheduled Monument.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 15MI/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionately affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The pipeline passes through the Staines Moor SSSI and due to the proximity of the South West London Waterbodies SPA and adjacent BAP priority habitats. Construction activities are likely to increase Affinity Water's carbon footprint resulting in minor negative effects during both construction and operation. Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. Consequently there is likely to be minor negative effects during construction and operation with regard to surface water bodies and the local environments resilience to climate change. The new pipeline route passes within close proximity to Listed Buildings and a Scheduled Monument.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1			0
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	The pipeline passes through the Staines Moor SSSI and due to the proximity of the South West London Waterbodies SPA and adjacent BAP priority habitats. Construction activities are likely to increase Affinity Water's carbon footprint resulting in minor negative effects during both construction and operation. Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. Consequently there is likely to be minor negative effects during construction and operation with regard to surface water bodies and the local environments resilience to climate change. The new pipeline route passes within close proximity to Listed Buildings and a Scheduled Monument.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Regional	High	N/A	-2	0	This option will require a new 700 mm diameter main (27.9 km in length) from WALs via CHERS and EGHS to HWFS Treatment Works. The pipeline cuts across several major roads including the A30 and A3040. There is likely to be significant temporary negative effects during construction.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	The pipeline passes through the Staines Moor SSSI and due to the proximity of the South West London Waterbodies SPA and adjacent BAP priority habitats. Construction activities are likely to increase Affinity Water's carbon footprint resulting in minor negative effects during both construction and operation. Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. Consequently there is likely to be minor negative effects during construction and operation with regard to surface water bodies and the local environments resilience to climate change. The new pipeline route passes within close proximity to Listed Buildings and a Scheduled Monument.	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	This scheme will require a new 700 mm diameter main (27.9 km in length) from WALs via CHERS and EGHS to HWFS Treatment Works and new booster pumps at WALs, CHERS and EGHS Treatment Works.	0

	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	Medium	?	Medium term (5-25 years)	?	Temporary	?	National	High	-1	?	Pipeline passes along road (A3044) that splits the two sections of South West London Waterbodies SPA, designated for European important numbers of over-wintering gadwall and shoveler. Works may cause disturbance to this site. Depending on the depth of the pipes and whether this area of the site contains sealed reservoirs, there is potential for changes to the hydrology of this site.	-1	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Medium term (5-25 years)	?	Permanent	?	Local	Low	-1	?	Pipeline passes adjacent to several parcels of BAP priority habitat deciduous woodland, and through one parcel south of Sutton. Pipeline crosses River Thames via a road bridge. Loss of priority habitat should be avoided where possible. If this is not possible, compensatory habitat will be required. CEMP should be in place to avoid disturbance.		
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	?	None identified - ecological survey required		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Medium	?	Medium term (5-25 years)	?	?	?	?	Regional	High	-1	-1		Pipeline passes adjacent to Staines Moor SSSI, designated primarily for the habitats they support. Potential for disturbance or changes in hydrology to these sites.
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	?	?	?		Potential for enhancements such as planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Once reinstatement has been carried out the new pipeline will not be visible. Upgrades to pumping stations will not significantly alter infrastructure which is already present. The route does not run through any sensitive areas and as such no significant effects are predicted.	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality given the presence of the M25, M40, M3 and other major roads close to the route. However, it is noted that the option is partially within the Hillingdon AQMA.	0	
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	-1	-1	Construction activities are likely to increase Affinity Water's carbon footprint, with minimal operational impacts.	-1	

											current pipe lines is required.			
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-3	0	The pipeline route crosses a significant portion of grade 1 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.1.1.5 AFF-CTR-WRZ3-0076

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	There may be minor negative construction phase effects on biodiversity due to the proximity of BAP habitat to the reservoir and pipeline route. With regards to climate change, the increased energy demand from boosters will likely increase the company's overall energy use and will result in minor negative effects during construction and operation. Assumed that PRER expansion requires small extension of existing reservoir site. This site is within 60m of a Registered park and garden. There is therefore potential for negative effects during the construction phase. The Reservoir is located in ALC Grade 3 land. It is not clear whether this is Grade 3a or 3b. In any case, there may be temporary negative effects through construction but from an operational perspective, once the land is reinstated there should be a neutral effect. The addition of further supply by this option should result in operation phase positive effects in terms of climate change resilience though increasing overall supply.	N/A	High	Low	High	Temporary	Permanent	Local	?	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 40Ml/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	Low	High	Temporary	Permanent	Local	?	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	Low	High	Temporary	Permanent	Local	?	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	There may be minor negative construction phase effects on biodiversity due to the proximity of BAP habitat to the reservoir and pipeline route. With regards to climate change, the increased energy demand from boosters will likely increase the company's overall energy use and will result in minor negative effects during construction and operation. Assumed that PRER expansion requires small extension of existing reservoir site. This site is within 60m of a Registered park and garden. There is therefore potential for negative effects during the construction phase. The Reservoir is located in ALC Grade 3 land. It is not clear whether this is Grade 3a or 3b. In any case, there may be temporary negative effects through construction but from an operational perspective, once the land is reinstated there should be a neutral effect. The addition of further supply by this option should result in operation phase positive effects in terms of climate change resilience though increasing overall supply.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Construction work will be within the land adjacent to the site boundaries and no PRoW have been identified.	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	There may be minor negative construction phase effects on biodiversity due to the proximity of BAP habitat to the reservoir and pipeline route. With regards to climate change, the increased energy demand from boosters will likely increase the company's overall energy use and will result in minor negative effects during construction and operation. Assumed that PRER expansion requires small extension of existing reservoir site. This site is within 60m of a Registered park and garden. There is therefore potential for negative effects during the construction phase. The Reservoir is located in ALC Grade 3 land. It is not clear whether this is Grade 3a or 3b. In any case, there may be temporary negative effects through construction but from an operational perspective, once the land is reinstated there should be a neutral effect. The addition of further supply by this option should result in operation phase positive effects in terms of climate change resilience though increasing overall supply.	High	High	Short term (< 5 years)	N/A	Temporary	Temporary	Local	Low	None proposed	-1	0	The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None proposed	0			0
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	There may be minor negative construction phase effects on biodiversity due to the proximity of BAP habitat to the reservoir and pipeline route. With regards to climate change, the increased energy demand from boosters will likely increase the company's overall energy use and will result in minor negative effects during construction and operation. Assumed that PRER expansion requires small extension of existing reservoir site. This site is within 60m of a Registered park and garden. There is therefore potential for negative effects during the construction phase. The Reservoir is located in ALC Grade 3 land. It is not clear whether this is Grade 3a or 3b. In any case, there may be temporary negative effects through construction but from an operational perspective, once the land is reinstated there should be a neutral effect. The addition of further supply by this option should result in operation phase positive effects in terms of climate change resilience though increasing overall supply.	Low	Low	Short term (< 5 years)	N/A	Temporary		Local	Low	None proposed	-1	0	Construction of new booster pumps, surge vessels and the storage reservoir is likely to require new raw materials.	0	
	4.b. Result in higher levels of reuse of waste?		Low	Low	N/A	N/A	Temporary		N/A	N/A	N/A	None proposed	0			0
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	There may be minor negative construction phase effects on biodiversity due to the proximity of BAP habitat to the reservoir and pipeline route. With regards to climate change, the increased energy demand from boosters will likely increase the company's overall energy use and will result in minor negative effects during construction and operation. Assumed that PRER expansion requires small extension of existing reservoir site. This site is within 60m of a Registered park and garden. There is therefore potential for negative effects during the construction phase. The Reservoir is located in ALC Grade 3 land. It is not clear whether this is Grade 3a or 3b. In any case, there may be temporary negative effects through construction but from an operational perspective, once the land is reinstated there should be a neutral effect. The addition of further supply by this option should result in operation phase positive effects in terms of climate change resilience though increasing overall supply.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	High	None proposed	0	0	No European sites are affected by this option.	0	
	5.b. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	High	None proposed	0	0		The scheme involves the use of an existing pipeline between PRER and BUGR. No adverse impacts are anticipated to Wains Wood, Knebworth Woods, Tewinbury, Benington High Wood and Sherrardspark Wood SSSI.

	5.c. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Medium	N/A	Medium term (5 -25 years)	N/A			Local	Low	A CEMP should be implemented during construction. Ecological surveys are required. Investigations into linking hydrological pathways.	-1	0	BUGR is adjacent to BAP Priority habitat deciduous woodland. PRER is located 119m from BAP Priority habitat deciduous woodland. The existing pipeline passes through BAP Priority habitat lowland meadows and good quality semi-improved grassland. The existing pipeline is also adjacent to BAP Priority habitat traditional orchard. Potential for noise, light and dust disturbance during construction of the new building for booster pumps at BUGR to BAP Priority habitat deciduous woodland. Potential for changes in hydrology to BAP Priority habitats due to upgrades at PRER.	
	5.d. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified. Ecological surveys are required.	?	?	No invasive species identified, however detailed ecological survey are required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	Low	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Measures such as screening/planting will reduce the residual effect / may provide enhancement during operational phase.	-1	0	Assumed that PRER expansion requires small extension of existing reservoir site. There are likely to be minor negative effects on landscape during construction phase.	0
	6.b. Provide opportunities for landscape enhancement?	Low	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low		0	1	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	CEMP should include measures to reduce air pollution from construction (e.g. damping down and the use of covers on HGVs)	-1	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the site is not located within an AQMA. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Where possible, construction methods should minimise energy use. During operation, sources of renewable energy should be considered e.g. solar panels on buildings to provide power to the boosters.	-1	-1	Increased energy demand from boosters will likely increase the company's overall energy use.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Long term >25 years	N/A	Permanent	Regional	Low	None proposed	0	0	N/A	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Long term >25 years	N/A	Permanent	Regional	Low	None proposed	0	1	The addition of the DO from this option should also increase the resilience in the Operating Area though increasing overall supply.	1

10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water bodies affected by this scheme.	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water bodies affected by this scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water bodies affected by this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water bodies affected by this scheme.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water bodies affected by this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None proposed	-1	0	An element of the main is in a 1:100 year flood zone but it is not considered that this will be affected by this option.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	N/A	Appropriate reinstatement of any land affected	-1	0	Assumed that PRER expansion requires small extension of existing reservoir site. This site is within 60m of a Registered park and garden. There is therefore potential for negative effects during the construction phase. Although appropriate reinstatement of any land affected should reduce these effects there may be a minor residual negative effect. Once mitigation is taken into account it is considered that there would be a residual neutral effect during operation.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None proposed	0	0	N/A	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Appropriate reinstatement of any land affected	-1	0	The Reservoir is located in ALC Grade 3 land. It is not clear whether this is Grade 3a or 3b. In any case, there may be temporary negative effects through construction but from an operational perspective, once the land is reinstated there should be a neutral effect.	0

1.1.1.6 AFF-CTR-WRZ4-0750

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD Score Operational effect (worst case)
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The pipeline cuts across several major roads and will result in major negative effects on the strategic transport infrastructure during construction. There may also be minor negative effects on public	N/A	High	Low	High	Temporary	Permanent	Local	?	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 40MI/d	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	Low	High	Temporary	Permanent	Local	?	0	1			

	1.c. Enable the growth ambitions of the study area to be realised?	rights of way and critical services. However, it is predicted that the residual effect during operation will be neutral. The construction and operation phase activities are likely to increase Affinity Water's carbon footprint and are considered to have a moderate negative effect on Affinity Waters carbon footprint over construction and operation phase. Further abstraction may have a negative effect on the environment and the pipeline crosses several river channels whose hydromorphology could potentially be impacted. Consequently it is considered that	N/A	High	Low	High	Temporary	Permanent	Local	?		0	1	equates to a minor positive effect.	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	This option requires 30.7 km of 600 mm diameter main to a 40 MI New HARR. A new pipeline of this length is likely to sever sections of public rights of way and other amenity assets. This has the potential for a temporary short term minor negative effect.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Regional	High	N/A	-3	0	This option requires 30.7 km of 600 mm diameter main to a 40 MI New HARR. The pipeline cuts across several major roads including the M4, M25, A4020, A40, AND A4005. There is likely to be significant temporary negative effects during construction.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-2	0	The option will require 4 x 75 kw Intake pumps to be installed at SUNN, 4 x 110 kW Booster Pumps to be installed at New HWFS Water Treatment Works, New Water Treatment Works, 4 x 90 kW Booster Pumps to be installed at New HARR, 30.7 km of 600 mm diameter main and a 40 MI New HARR.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	None identified	?

	Medium	N/A	Medium term (5-25 years)	N/A	Temporary	N/A	Local	Low				
5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?									Avoidance of hedgerow severance at Harrow School Farm, or re-instating hedgerows post construction. CEMP in place to prevent acoustic/light/dust etc disturbance to deciduous woodland and watercourses.	-1	0	Pipeline passes adjacent to BAP priority habitat deciduous woodland using an existing road to the east of HWFS Treatment Works, east of Yiewsley, at Wood End, north of Northolt, and at Harrow on the Hill. Pipeline passes adjacent to BAP priority habitat good quality semi-improved grassland. There is a potential for disturbance (noise, light, dust etc.) to these habitats during construction. Pipeline crosses several watercourses by road bridges. Potential for impacts (loss, pollution, changes in hydrological conditions and disturbance) to these watercourses during construction. Pipeline crosses fields with potential for hedgerow severance at Harrow School Farm, also crosses a drain in this location. The new reservoir location within this area may also affect these habitats, and is potentially adjacent to BAP priority habitat deciduous woodland. The new reservoir may affect the hydrology of this location. Iwer Treatment Works will be upgraded. Depending on the works required there may be some disturbance to BAP priority habitat deciduous woodland and waterbodies, situated adjacent to the Treatment Works site.
5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.
5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	None identified
5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as planting of native wildflower/pollinator meadows or other biodiversity benefiting planting schemes. Reinstate any severed hedgerows, potential to increase hedgerow planting in location of Harrow School Farm.	?	?	Potential for enhancements such as planting of native wildflower/pollinator meadows or other biodiversity benefiting planting schemes. Reinstate any severed hedgerows, potential to increase hedgerow planting in location of Harrow School Farm.

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and landscape character assessments should be carried out where significant infrastructure works will be carried out.	-2	0	The reservoir may be partially visible above ground when completed and a new pump house will be required at the reservoir. The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. The pipeline route travels through multiple residential area and a Country Park. Therefore, given the likely visibility of construction works and the number and sensitivity of receptors, there will be short-term temporary negative effects associated with the construction phase of the pipeline.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality given the presence of several major roads including the M4 and M25 adjacent to the site. However, it is noted that the sites is partially within the Hillingdon AQMA.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-2	Construction and operation phase activities are likely to increase Affinity Water's carbon footprint.	-2
	8.b. Maximise the company's resilience to a changing climate?	Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. There is potential for disturbance to BAP priority habitat.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydromorphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Local	Low	N/A	0	-1	Although abstraction not dealt with in this scheme (agreement with Thames water) the abstraction might have some in-combination impacts on the Lower Thames Gravels Groundwater Body	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact/effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Low	Monitoring of groundwater and surface water levels downstream of abstraction and use of trigger levels	-1	-1	Supply is not dealt with in this scheme. However, in-combination impacts of abstraction on the Lower Thames Gravels Groundwater Body may require WFD assessment. Transfer pipeline crosses several surface water bodies (Colne Brook, Colne (Confluence Chess to River Thames), Pinn, Yeading Brook) with the potential for disturbance to water quality during construction works. Where pipeline crosses waterbodies, potential to impact (loss, pollution, disturbance and changes in hydrological conditions) habitats present and associated species, that may continue after construction.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option runs through areas of 1 in 100 year flood plains. However, it will not lead to loss of floodplain or significantly increase surface water runoff.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full reinstatement of any land affected by construction.	-2	0	The new pipeline route passes within close proximity (less than 10m) to a number of Listed Buildings and within 60m of a Scheduled Monument. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of affected land is anticipated to result in negative effects being short-term, temporary and not experienced during the operational phase. It is considered unlikely that the new booster pumps will have negative effects of significance on the historic environment given that they will be located on existing sites and the distance from designated heritage assets. It is considered that there are suitable mitigation measures available to ensure that residual effects are neutral during operation.	0

	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-3	0	The pipeline route crosses a significant portion of grade 1 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.1.1.7 AFF-CTR-WRZ5-0751

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This is route cuts across several strategic transport networks including the A40, A4007, M25, M4. Therefore, there will be major temporary negative effects during construction. Additionally, construction and operation phase activities are likely to increase Affinity Water's carbon footprint. The pipeline crosses several river channels whose hydro morphology could potentially be impact, this option will therefore have a minor negative effect on water bodies and the local environment. There will also be moderate construction phase effects on the historic environment due to the proximity of designated assets. However, these effects should not be experienced during construction phase.	N/A	High	Low	High	Temporary	Permanent	Local	?	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 40MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	Low	High	Temporary	Permanent	Local	?	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	Low	High	Temporary	Permanent	Local	?	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	This is route cuts across several strategic transport networks including the A40, A4007, M25, M4. Therefore, there will be major temporary negative effects during construction. Additionally, construction and operation phase activities are likely to increase Affinity Water's carbon footprint. The pipeline crosses several river channels whose hydro morphology could potentially be impact, this option will therefore have a minor negative effect on water bodies and the local environment. There will also be moderate construction phase effects on the historic environment due to the proximity of designated assets. However, these effects should not be experienced during construction phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The Pipe crosses watercourses - Alderbourne and Colne - with the potential for disturbance to water quality during construction works. There may therefore be some minor negative effects on angling and other water based recreation activities during construction. No residual effects on angling are anticipated during operation.	
	2.c.. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	This scheme requires new mains from the River Thames at SUNN, to the HWFS Treatment Works and then transfer by a new main for storage at HARE. A new pipeline of this length is likely to sever sections of public rights of way and other amenity assets. This has the potential for a temporary short term minor negative effect.	

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Regional	High	N/A	-3	0	This scheme requires new mains from the River Thames at SUNN, to the HWFS Treatment Works and then transfer by a new main for storage at HARE. This is route cuts across several strategic transport networks including the A40, A4007, M25, M4. There is likely to be significant temporary negative effects during construction.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	0
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-3	0	The scheme will require 5 x 55kw Booster pumps to be installed at SUNN, 5 x 110kW Booster Pumps to be installed at HWFS Treatment Works, New Treatment Works, 25.5km of 600mm diameter main and a 25MI upgrade of HARE.	0
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	?	?	?	?	?	?	National	High	In combination effects of increased abstraction if required under the Lower Thames Operating Agreement	?	?	If increased abstraction required, potential for in combination effects of changes in hydrology.	?

	<p>5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?</p>	High	?	Long term >25 years	?	Permanent	?	Local	Low	<p>Loss of BAP Priority habitat should be avoided where possible. If not possible, compensatory habitat will be required.</p> <p>Ecological survey required. CEMP should be in place during construction.</p>	-1	?	<p>Pipeline passes adjacent to and through (using existing roads) several parcels of BAP priority habitat deciduous woodland. Pipeline passes through one parcel of BAP Priority habitat deciduous woodland south of HARE. HARE is 55m from Top Wood French Grove ancient woodland and deciduous woodland Priority habitat. Pipeline passes adjacent to a parcel of good quality semi improved grassland Priority habitat. Pipeline passes several parcels of ancient woodland; 75m from an unnamed woodland east of Chandler's Hill, 12m from an unnamed woodland north-east of Chandler's Hill, 80m from Common Plantation, 150m from Bayhurst Wood, 80m from Claypits, 300m from Ashain Springs, 100m from Scarlet Springs, 250m from Deadman's Grove, 160m from Battlers Wells Wood and 150m from French Grove. There is the potential for these ancient woodland parcels to be disturbed (through noise, light, dust etc.) during the construction of this Option. Location of HWFS Treatment Works is around 50m from BAP priority habitat deciduous woodland, however is separated from this by the M25 motorway. Therefore this habitat will already undergo light and noise disturbance. Site is also adjacent to waterbodies, potential for noise and light disturbance to these.</p>
	<p>5.c. Impact on non-native species?</p>	?	?	?	?	?	?	?	?	None identified. A detailed ecological survey and desk study will be required	?	?	None identified. If present, potential for disturbance and spread into the wild
	<p>5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?</p>	High	?	Medium term (5 -25 years)	?	Temporary	?	Regional	Moderate	Disturbance effects could be minimised by small alterations in the pipeline route, use of appropriate construction methodologies, and timing of works	-1	?	Disturbance to SSSI features. Depending on the depth of the pipework works could result in hydrogeological changes to the site.
	<p>5.e. Provide opportunities for biodiversity enhancement?</p>	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.
<p>6. Conserve and enhance landscape character and visual amenity?</p>	<p>6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?</p>	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and landscape character assessments should be carried out where significant infrastructure works will be carried out.	-1	0	<p>The pipeline route runs within 150m of the Bishops Wood Country park. Construction may have a negative effect on the landscape setting and character. However, once re-instated the likely residual effect will be neutral.</p>

	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	N/A	-1	0	Sections of the option are situated within the Hillingdon AQMA. Construction activities and associated congestion has the potential to worsen air quality within the AQMA and therefore result in significant negative effects.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-2	Construction and operation phase activities are likely to increase Affinity Water's carbon footprint.	-2
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of affinity water's assets to climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. There is potential for disturbance to SSSI features during construction.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact/effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run-off.	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-2	0	The option will require new Treatment Works at Iver, which will be visible once completed, and have a residual negative effect on nearby (less than 60m) grade II listed buildings. There will also be 25.5km of 600mm diameter main and a 25MI upgrade of HARE. The piping and reservoir expansions should not be visible once completed. However the piping will be installed approximately 7m from a listed building and 60m from a scheduled monument. This will result in short term temporary negative effects on these heritage assets during construction through loss of setting and character. Assuming appropriate re-instatement the residual effect during operation should be neutral.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 1 and 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.1.1.8 AFF-CTR-WRZ5-0753

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters Worst	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	There may be minor negative construction phase effects on strategic transport infrastructure and knock on effects on critical services and industries. The pipeline route passes 11m from the Debden Water SSSI and crosses some areas of BAP Priority Deciduous Woodland. Therefore, there may be moderate negative effects to this SSSI during construction phase. Construction activities are likely to increase Affinity Water's carbon footprint, with minor negative construction and operational effects. The pipeline passes around the perimeter of a Registered Park and Garden, and crosses some areas of Grade 2 agricultural land. There is therefore the potential for minor negative effects on heritage and agricultural land during construction phase.	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option (to WRZ5). 30 MI/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			N/A
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			N/A
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	Any water quality changes are anticipated to be short-term and imperceptible to recreational users. No operation impacts on the footpaths or nearby waterbodies are anticipated. The moderate negative impacts on Debden Water may have minor short term impacts on informal recreation.		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The construction impacts are anticipated to be insignificant as it is anticipated that the footpaths will be rerouted whilst the pipeline construction is underway.		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	One well used road will be affected by the scheme: B1052 0.5km, Unclassified 0.3. B roads assessed due to greater length affected and greater likelihood of significant congestion impacts.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with the new pipeline.		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	This option requires a new 8.8km main between UTTL and SIBR and 4 x 160kW Booster Pumps at UTTL.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	?	?	?	?	?	?	?	?	?	?	If increased abstraction required, potential for in combination effects of changes in hydrology.	?	

<p>5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?</p>	<p>Medium</p>	<p>N/A</p>	<p>Medium term (5 - 25 years)</p>	<p>N/A</p>	<p>Temporary</p>	<p>N/A</p>	<p>Regional</p>	<p>Moderate</p>	<p>The pipeline passes 11m from Debden Water SSSI; there is the potential for disturbance (noise, light, dust etc.) to this habitat during construction. Ecological surveys are required, and a CEMP should be in place during construction.</p>	<p>-2</p>	<p>0</p>	<p>The pipeline passes 11m from Debden Water SSSI; there is the potential for disturbance (noise, light, dust etc.) to this habitat during construction.</p>
<p>5.c. Impact on non-native species?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>No invasive species identified, however detailed ecological survey required.</p>	<p>?</p>	<p>?</p>	<p>No invasive species identified, however detailed ecological survey required.</p>
<p>5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?</p>	<p>High</p>	<p>N/A</p>	<p>Long term >25 years</p>	<p>N/A</p>	<p>Permanent</p>	<p>N/A</p>	<p>Local</p>	<p>Low</p>	<p>The loss of BAP Priority habitat and potentially the severance of hedgerows should be avoided where possible; if not possible, compensatory habitat will be required. A CEMP should be in place during construction. Ecology surveys will be required.</p>	<p>-1</p>	<p>0</p>	<p>Pipeline crosses through two parcels of BAP Priority habitat deciduous woodland; east of Amberden Hall and west of Debden Water SSSI. The pipeline also passes adjacent to or within 100m of several parcels of BAP Priority habitat deciduous woodland. The pipeline crosses several fields, with the possibility of hedgerow severance during construction. The pipeline also crosses several watercourses, including at Debden Water SSSI and the River Cam or Granta north of Thistley Hall. The pipeline passes adjacent to or within 250m of several ponds. The pipeline passes 30m from Horseley Wood Ancient Woodland, 70m from Park Wood Ancient Woodland and 175m from Brakey Ley Wood Ancient Woodland. The construction of this option would currently result in the loss of BAP Priority habitat and potentially the severance of hedgerows. This option also has the potential to result in the disturbance (noise, light, dust etc.) to BAP Priority habitat deciduous woodland, waterbodies and ancient woodland during construction.</p>
<p>5.e. Provide opportunities for biodiversity enhancement?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.</p>	<p>?</p>	<p>?</p>	<p>Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.</p>

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There are likely to be short-term temporary minor negative effects on landscape during construction phase of the new pipeline. The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. The upgrade of booster pumps and existing buildings may have also have a minor negative effect during construction; however, once mitigation is taking into account it is predicted that the residual effect during operation will be neutral	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-1	-1	Construction activities are likely to increase Affinity Water's carbon footprint, with minor negative operational effects.	-1
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option provides greater resilience in WRZ5.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	?	Design and construction methods should follow sustainable design principles.	0	-1	No abstraction provided as part of this Option. However, potential for in combination effects if increased abstraction to support this Option is required under another Option or scheme. Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. There is potential for disturbance to BAP Priority habitat deciduous woodland and watercourses, including at Debden Water SSSI and the River Cam or Granta north of Thistley Hall.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	0	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water treatment in scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact/effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are	

													neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water runoff.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The pipeline passes around the perimeter of a Registered Park and Garden, there is therefore the potential for minor negative effects on heritage during construction phase. The pipeline will be buried and appropriate reinstatement of land will reduce the residual effect during operational phase to neutral.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.1.1.9 AFF-CTR-WRZ5-0869

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	Well used roads will be affected by the option, as such there may be a minor negative effect during construction phase with minor indirect negative effects on critical services and industries. Although this option does not require further abstraction, there is potential for in minor negative in combination effects if increased abstraction to support this Option is required under another Option. The new pipeline passes within 10m of the Temple Dinsley Registered Park and Garden, the Great Wymondley Castle Scheduled Monument and a significant number of Listed Buildings and crosses areas of grade 2 agricultural land. Therefore it may have minor negative effects on heritage and agricultural land during construction phase.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option (to WRZ5). 25 Ml/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			N/A
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			N/A
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The anticipated minor residual impacts on water quality or flow are not anticipated to be perceptible to the majority of informal bankside recreation users.		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	N/A	-1	0	Well used roads will be affected by the option: A1(M), A10, A505, A507, A602, B1039, B1368, B1383, B197, B656, M11. 5km B roads, 7.6km unclassified roads, 0.1km motorway, 0.1km A roads	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be minor indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	The option will require 46.55km of new 600mm diameter main from PRER to UTTL and 4 x 55kW Booster Pumps at PRER and 4 x 55kW Booster Pumps at WICK.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	?	?	?	?	?	?	?	?	Potential for HRA of in combination impacts	?	?	Potential for in combination effects on European designated sites if increased abstraction required to support this option under a different scheme/ option.	?		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Medium	N/A	Short term (< 5 years)	?	Temporary	?	Regional	Moderate	Ecological survey required. CEMP should be implemented during construction.	-1	0	Loss of BAP Priority habitat and CWS should be avoided where possible. Where this is not avoidable compensatory habitat likely to be required. No HRA implications identified as it is assumed that water will always be available as part of this option. However, if increased abstraction required to support this option under another scheme/ option, in combination HRA may be required.			

	5.c. Impact on non-native species?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.		
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Ecological survey required. Small pipeline route changes to prevent degradation of BAP Priority habitats. CEMP should be implemented during construction.	-1	0	Pipeline is adjacent to deciduous woodland BAP Priority habitat and in proximity to numerous other parcels of deciduous woodland BAP Priority habitat along the pipeline length; adjacent to lowland calcareous grassland BAP Priority habitat ad within 35m of Lowland calcareous grassland BAP Priority habitat and good quality semi-improved grassland and 88m of ancient woodland. Potential for changes in hydrology of the site depending on depth of pipeline. Potential for acoustic, light and dust disturbance during construction.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	There are likely to be short-term temporary minor negative effects on landscape during construction phase of the new pipeline. The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. The upgrade of booster pumps and existing buildings may have also have a minor negative effect during construction; however, once mitigation is taking into account it is predicted that the residual effect during operation will be neutral.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-1	Raw materials will be required for new mains, pumps and storage vessels. The construction and operation will lead to significant energy use.	-1
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading supply resilience this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	?	Design and construction methods should follow sustainable design principles.	0	-1	No abstraction provided as part of this Option. However, potential for in combination effects if increased abstraction to support this Option is required under another Option or scheme. Further abstraction may have a negative effect on the environment if not properly monitored and licensed	-1

10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	0	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water treatment in scheme	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A		Local	Low	Best construction practice.	0	0	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water runoff.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The new pipeline passes within 10m of the Temple Dinsley Registered Park and Garden, the Great Wymondley Castle Scheduled Monument and a significant number of Listed Buildings. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.1.1.10 AFF-CTR-WRZ5-1043

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This route cuts across the A602 and A10. Consequently, there may be minor negative effects on the strategic transport infrastructure with knock on minor negative effects on critical services and industries. There may minor negative effects on biodiversity during construction and operation due to loss of BAP priority habitats, and chances to the hydrology of the River Ash due to the HADH upgrades. The reservoir upgrade may also have a minor negative effect on landscape during construction and operation. Construction and operation phase activities are also likely to increase Affinity Water's carbon footprint and result in minor negative effects over operation phase. Although this option does not require further abstraction, there is potential for in minor negative in combination effects if increased abstraction to support this Option is required under another Option. The option crosses areas of grade 2 agricultural land. Therefore it may have minor negative effects on agricultural land during construction phase.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 50 MI/d equates to a moderate positive effect.	2	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2	N/A		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2	N/A		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	This route cuts across the A602 and A10. Consequently, there may be minor negative effects on the strategic transport infrastructure with knock on minor negative effects on critical services and industries. There may minor negative effects on biodiversity during construction and operation due to loss of BAP priority habitats, and chances to the hydrology of the River Ash due to the HADH upgrades. The reservoir upgrade may also have a minor negative effect on landscape during construction and operation. Construction and operation phase activities are also likely to increase Affinity Water's carbon footprint and result in minor negative effects over operation phase. Although this option does not require further abstraction, there is potential for in minor negative in combination effects if increased abstraction to support this Option is required under another Option. The option crosses areas of grade 2 agricultural land. Therefore it may have minor negative effects on agricultural land during construction phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0		
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	0	0		The construction impacts are anticipated to be insignificant as it is anticipated that the footpaths will be rerouted whilst the pipeline construction is underway. No operation impacts are anticipated.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	This route cuts across the A602 and A10. Consequently, there may be minor negative effects on the strategic transport infrastructure with knock on minor negative effects on critical services and industries. There may minor negative effects on biodiversity during construction and operation due to loss of BAP priority habitats, and chances to the hydrology of the River Ash due to the HADH upgrades. The reservoir upgrade may also have a minor negative effect on landscape during construction and operation. Construction and operation phase activities are also likely to increase Affinity Water's carbon footprint and result in minor negative effects over operation phase. Although this option does not require further abstraction, there is potential for in minor negative in combination effects if increased abstraction to support this Option is required under another Option. The option crosses areas of grade 2 agricultural land. Therefore it may have minor negative effects on agricultural land during construction phase.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	N/A	-1	0	The option requires 19.9km of new 700mm diameter main from BUGR Reservoir to HADH. This route cuts across the A602 and A10. There are likely to be temporary negative effects during construction.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be minor indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	This route cuts across the A602 and A10. Consequently, there may be minor negative effects on the strategic transport infrastructure with knock on minor negative effects on critical services and industries. There may minor negative effects on biodiversity during construction and operation due to loss of BAP priority habitats, and chances to the hydrology of the River Ash due to the HADH upgrades. The reservoir upgrade may also have a minor negative effect on landscape during construction and operation. Construction and operation phase activities are also likely to increase Affinity Water's carbon footprint and result in minor negative effects over operation phase. Although this option does not require further abstraction, there is potential for in minor negative in combination effects if increased abstraction to support this Option is required under another Option. The option crosses areas of grade 2 agricultural land. Therefore it may have minor negative effects on agricultural land during construction phase.	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	The option will require 19.9km of new 700mm diameter main from BUGR to HADH, a 50MI capacity upgrade at HADH and 4 x 250kW relief booster pumps at HADH (3 x Duty, 1 x Standby).	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	This route cuts across the A602 and A10. Consequently, there may be minor negative effects on the strategic transport infrastructure with knock on minor negative effects on critical services and industries. There may minor negative effects on biodiversity during construction and operation due to loss of BAP priority habitats, and chances to the hydrology of the River Ash due to the HADH upgrades. The reservoir upgrade may also have a minor negative effect on landscape during construction and operation. Construction and operation phase activities are also likely to increase Affinity Water's carbon footprint and result in minor negative effects over operation phase. Although this option does not require further abstraction, there is potential for in minor negative in combination effects if increased abstraction to support this Option is required under another Option. The option crosses areas of grade 2 agricultural land. Therefore it may have minor negative effects on agricultural land during construction phase.	?	?	?	?	?	?	?	?	If increased abstraction required, potential for in combination effects of changes in hydrology.	0	0	If increased abstraction required, potential for in combination effects of changes in hydrology.	-1	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N.A	0	0		N/A
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?		No invasive species identified, however detailed ecological survey required.

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	?	Long term >25 years	?	Permanent	?	Local	Low	Detailed ecological surveys required. CEMP should be in place during construction. Will need to consider combination effects on waterbodies crossed for WFD assessment. Loss of BAP Priority habitat should be avoided where possible. If not possible, compensatory habitat will be required. Detailed ecological survey required.	-1	-1	There is a potential for disturbance (noise, light, dust etc.) to BAP Priority habitats during construction. There is also potential for changes in hydrology of the site depending on depth of pipeline. The upgrades to HADH may affect the hydrology of the River Ash and aquatic habitats present. There may be some disturbance to BAP Priority habitats of coastal and floodplain grazing marsh during the upgrade. Detailed ecological survey required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	The loss of BAP Priority habitat should be avoided where possible; if not possible, compensatory habitat will be required. A CEMP should be in place during construction. Ecology surveys will be required of terrestrial and aquatic habitats.	?	?	There is a potential for disturbance (noise, light, dust etc.) to BAP Priority habitats during construction. There is also a potential for disturbance to watercourses(River Ash and River Rib) during construction. The upgrades to HADH may affect the hydrology of the River Ash and aquatic habitats present. There may be some disturbance to BAP Priority habitats of coastal and floodplain grazing marsh during the upgrade. Detailed ecological survey required. Loss of BAP Priority habitat should be avoided where possible. If not possible, compensatory habitat will be required. Potential for species roosting/nesting in houses adjacent to the pipeline route to be disturbed during construction. Ecological surveys required. Potential for disturbance to Priority habitats, CWS and ancient woodland during construction. Also potential disturbance to Waterford Wood LNR during construction. Potential for changes in hydrology of the site depending on depth of pipeline. Ecological assessments required, and CEMP should be in place during construction.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	N/A	-1	-1	Mitigation including screening/planting should ensure that the residual effects during operation are reduced. However, given the uncertainty over the reservoir upgrade and mitigation to provided it is assumed that there will be a minor negative effect on the landscape during operation.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Long term (>25 years)	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-1	Construction and operation phase activities are likely to increase Affinity Water's carbon footprint.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the transfer capacity this option should result in positive effects on the resilience of affinity water's assets to climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	-1	-1	No abstraction provided as part of this Option. However, potential for in combination effects if increased abstraction to support this Option is required under another Option or scheme. Further abstraction may have a negative effect on the environment if not properly monitored and licensed	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term (>25 years)	Temporary	Permanent	Local	Low	Best construction practice.	-1	0	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water treatment in scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Local	Low	Best construction practice.	0	0	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water runoff.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The new pipeline passes within 10m of a number of Listed Buildings. There will be short term, temporary negative effects associated with construction of the pipeline. However, with appropriate mitigation and reinstatement of the affected land the residual effects during operation are predicted to be neutral.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	

14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0
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1.1.1.11 AFF-CTR-WRZ1-1097

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	Well used roads will be affected by the option, as such there may be a minor negative effect during construction phase with minor indirect negative effects on critical services and industries. There may be minor indirect negative effects on biodiversity due to the proximity of BAP priority habitat and also Whippendell Wood SSSI and Little Heath Pit SSSI during construction phase. There are also likely to be construction phase minor negative effects on landscape. The pipeline route passes within close proximity to a significant number of Listed Buildings and crosses areas of grade 2 agricultural land. Therefore it may have minor negative effects on heritage and agricultural land during construction phase.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 40 MI/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	0	0	The construction impacts are not anticipated to be significant as it is anticipated that the footpaths will be rerouted whilst the pipeline construction is underway. No operation impacts are anticipated.		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	N/A	-1	0	The option requires a new 23.3km 700mm diameter main from HARE to Boxted Pump Station. This route cuts across the A4251, the A41, A412, A404 and the M25. There are likely to be significant temporary negative effects during construction.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be minor indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	The option will require 4 x 250kW Booster Pumps to be installed at HARE and a new 23.3km 700mm diameter main from HARE to Boxted Pump Station.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	?	?	?	?	?	National	High	If increased abstraction required to support this option under another scheme/ option, in combination HRA may be required.	?	0	Boxted Pump Station and the new pipeline is 2.7km from Chilterns Beechwoods SAC. If increased abstraction is required under another scheme/option to support this option, depending on the location of the increased abstraction there may be potential to impact on European sites.	?	

	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Medium	?	Short term (< 5 years)	?	Temporary	?	Local	Low	A CEMP should be in place during construction. Ecology surveys will be required of terrestrial and aquatic habitats.	-1	0	The pipeline route is within 600m of Whippendell Wood Site of Special Scientific Interest (SSSI) and 1.0km of Little Heath Pit SSSI. HARE is within 1.3km of Ruislip Woods SSSI and 1.7km of Old Park Wood SSSI. Depending on depth of pipeline, potential for changes to hydrology within designated sites. Also potential for noise, light and dust disturbance during construction.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Low	The loss of BAP Priority habitat should be avoided where possible; if not possible, compensatory habitat will be required. A CEMP should be in place during construction. Ecology surveys will be required of terrestrial and aquatic habitats.	-1	0	The pipeline route may result in the loss of BAP Priority habitat deciduous woodland. Potential for species roosting/nesting in houses adjacent to the pipeline route to be disturbed during construction. Potential for disturbance to Priority habitats and ancient woodland during construction. Potential for changes in hydrology of the site depending on depth of pipeline.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Low	N/A	-1	0	There are likely to be short-term temporary minor negative effects on landscape during construction phase of the new pipeline. The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. The upgrade of booster pumps and existing buildings may have also have a minor negative effect during construction; however, once mitigation is taking into account it is predicted that the residual effect during operation will be neutral.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The are likely to be negative effects on air quality during construction and the pipeline route passes through the Three Rivers District Council AQMA. However, considering the existing sources of atmospheric pollution in this area, including the M25 and Heathrow Airport, any increase in atmospheric pollution as a result of this option will be minor.	0

8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Long term (>25 years)	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-1	-1	Construction of new mains and pumps will require raw materials. Construction and operation of new mains and pumps will result in an increase of energy use.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading supply resilience this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	-1	No abstraction provided as part of this Option. However, potential for in combination effects if increased abstraction to support this Option is required under another Option or scheme. Further abstraction may have a negative effect on the environment if not properly monitored and licensed	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term (>25 years)	Temporary	Permanent	Local	Low	Best construction practice.	-1	0	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water treatment in scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact/effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water runoff.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The new pipeline passes within 10m of a significant number of Listed Buildings. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	

14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0
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1.1.1.12 AFF-CTR-WRZ3-1099

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option may have minor negative effects on public rights of way and strategic transport infrastructure during construction phase. There may also be minor negative effects during construction phase on biodiversity due to the proximity of the Chilterns Brechwoods SAC numerous SSSI's and BAP priority habitats. The pipeline crosses several river channels whose hydro morphology could potentially be impacted. Consequently there is likely to be minor negative effects on surface water body status. Additionally, there will be an increase in Affinity Water's carbon footprint due to construction and operation of this option. The pipeline route is partially within the Chilterns AONB. Therefore construction will have a negative effect on the landscape setting and character, there may also be a minor negative effect during operation depending on the infrastructure required.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 40 Ml/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			N/A
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			N/A
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option requires a new 17.06km 700mm diameter main from Boxted Pump Station to CHAU. A new pipeline of this length is likely to sever sections of public rights of way and other amenity assets. This has the potential for a temporary short term minor negative effect.		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option requires a new 17.06km 700mm diameter main from Boxted Pump Station to CHAU. This route cuts across the A4146 and the A5. There are likely to be minor temporary negative effects during construction.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	The Option will require 4 x 110kW Booster Pumps to be installed at Boxted Pump Station, a new 17.06km 700mm diameter main from Boxted Pump Station to CHAU and a 40MI capacity upgrade of CHAU.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	National	Low	If increased abstraction required to support this option under another scheme/ option, in combination HRA may be required.	-1	0	Boxted Pump Station and the new pipeline is 2.7km from Chilterns Beechwoods SAC. If increased abstraction is required under another scheme/option to support this option, depending on the location of the increased abstraction there may be potential to impact on European sites.	?	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	A CEMP should be in place during construction.	-1	0	Boxted Pump Station is 1.1km of Little Heath Site of Special Scientific Interest (SSSI). The pipeline is 2.6km from Blow's Down SSSI, 2.7km of Chilterns Beechwood SSSI and 3.8km from Kensworth Chalk Pit		

10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water treatment in scheme	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt within this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact/effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The new pipeline does not pass in close proximity to any designated heritage assets and once buried will not affect the landscape or historic environment. The upgrade to the reservoir and new pump house will also not significantly effect the historic environment.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

1.1.1.13 AFF-CTR-WRZ3-2001

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option may have minor negative effects on public rights of way and strategic transport infrastructure during construction phase with knock on minor effects on critical services and industries. There may also be minor negative effects during construction phase on biodiversity due to the proximity of numerous SSSI's and BAP priority habitats. The new pipeline is within 10m of two Registered Parks and Gardens. Construction may have a negative effect on the	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 40M/d equates to a moderate positive effect	2
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2		

2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	landscape setting and character. However, once re-instated the likely residual effect will be neutral. The pipeline crosses several river channels whose hydro morphology could potentially be impacted. Consequently there is likely to be minor negative effects on surface water body status. Additionally, there will be an increase in Affinity Water's carbon footprint due to construction and operation of this option. .	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	A minor significant impacts is anticipated at construction for the length of pipeline along footpaths (e.g. the Chiltern Way). The anticipated minor negative impacts on water quality or flow are not anticipated to be perceptible to informal bankside recreation users.		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option will require a new 15.9km 800mm diameter main from HADH to RYHI. This is route cuts across the M1 at one section, and A1081. There are likely to be temporary negative effects during construction.		0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be minor indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	the option will require 2 x 75kW Booster Pumps to be installed at CHAU and a new 20.97km 700mm diameter main from CHAU to PRER.		0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	?	?	?	?	?	National	High	None identified	?	?	The transfer route is located 9.8km from the Chilterns Beechwoods Special Area of Conservation (SAC). Given the distance of the transfer route from Chilterns Beechwoods SAC adverse impacts are unlikely.		?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		Medium	?	Short term (< 5 years)	?	Temporary	?	Local	Low	A CEMP should be in place during construction..	-1	0	The pipeline route is also located 880m from Wain Wood Site of Special Scientific Interest (SSSI), 2.5km from Blow's Down SSSI, 3.5km from Knebworth Woods SSSI and 3.7km from Kensworth Chalk Pit SSSI. Potential for noise, light and dust disturbance during construction to the closest of these sites.		
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Low	The loss of BAP Priority habitat should be avoided where possible; if not possible, compensatory habitat will be required. A CEMP should be in place during construction. Ecology surveys will be required of terrestrial and aquatic habitats.	-1	0	The pipeline route may result in the loss of BAP Priority habitat deciduous woodland. Potential for species roosting/ nesting in houses adjacent to the pipeline route to be disturbed during construction. Potential for disturbance to Priority habitats and ancient woodland during construction. Potential for changes in hydrology of the site depending on depth of pipeline.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and Landscape character assessments should be carried out where significant infrastructure works will be undertaken.	-1	0	The new pipeline is within 10m of two Registered Parks and Gardens. Construction may have a negative effect on the landscape setting and character. However, once re-instated the likely residual effect will be neutral	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-1	-1	Construction activities are likely to increase Affinity Water's carbon footprint, with minimal operational impacts.	-1
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option will increase affinity waters storage capacity.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	?	Design and construction methods should follow sustainable design principles.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. There is potential for disturbance to BAP Priority habitat deciduous woodland and watercourses, including at Debden Water SSSI and the River Cam or Grant north of Thistley Hall.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	-1

	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water treatment in scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact/effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The new pipeline is within 10m of two Registered Parks and Gardens. It is also located within 10m of a number Listed Buildings. There is therefore potential for significant negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

1.1.1.14 AFF-CTR-WRZ5-2006

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		Worst
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option may have minor negative effects on public rights of way and strategic transport infrastructure during construction phase with knock on minor effects on critical services and industries. There may also be minor negative effects during construction phase on biodiversity due to the proximity of numerous SSSI's and BAP priority habitats. The pipeline route passes within close proximity to a significant number of Listed Buildings and crosses areas of grade 2 agricultural land. Therefore it may have minor negative effects on heritage and agricultural land during construction phase. The pipeline crosses several river channels whose hydro morphology could potentially be impacted. Consequently there is likely to be minor negative effects on surface water body status. Additionally, there will be an increase in Affinity Water's carbon footprint due to construction and operation of this option.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 50Ml/d equates to a moderate positive effect	2
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option will require a new 15.9km 800mm diameter main from HADH to RYHI. A new pipeline of this length is likely to sever sections of public rights of way and other amenity assets. This has the potential for a temporary short term minor negative effect.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option will require a new 15.9km 800mm diameter main from HADH to RYHI. This is route cuts across the A414, and A1169. There are likely to be minor temporary negative effects during construction.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be minor indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-2	0	The option will require 4 x 250kW Booster Pumps to be installed at HADH and a new 15.9km 800mm diameter main from HADH to RYHI.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	?	?	?	?	?	?	?	None identified - this Option assumes that water will always be available via other schemes. However, if increased abstraction is required to support this option under another scheme/ option, in combination HRA may be required.	?	?	None identified - this Option assumes that water will always be available via other schemes. However, if increased abstraction is required to support this option under another scheme/ option, in combination HRA may be required.	?

	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Low	N/A	Medium term (5-25 years)	N/A	Temporary	N/A	Regional	Moderate	There is the potential for disturbance to Harlow Woods SSSI (noise, light, dust etc.) during construction. A CEMP should be in place during construction.	-1	0	The pipeline passes 150m from Harlow Woods SSSI (comprising ancient woodland). There is the potential for disturbance to this site (noise, light, dust etc.) during construction.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Low	The loss of BAP Priority habitats should be avoided if possible. If this is not possible, compensatory habitat may be required. There is the potential for disturbance to BAP Priority habitats during construction; a CEMP should be in place and ecological surveys are required.	-1	0	Hadham Hill Reservoir is located 28m from BAP Priority habitat coastal and floodplain grazing marsh and 84m from deciduous woodland Priority habitat. There is the potential for disturbance to these habitats during the installation of the additional booster pumps. A CEMP should be in place during construction. The pipeline passes through a parcel of BAP Priority habitat deciduous woodland east of Hadham Hill Reservoir. The pipeline passes adjacent to one parcel of BAP Priority habitat traditional orchard, adjacent to or within 100m of several parcels of BAP Priority habitat deciduous woodland and adjacent to a large area of coastal and floodplain grazing marsh Priority habitat Option potentially passes through hedgerow habitats, ecological surveys required. The loss of BAP Priority habitats should be avoided if possible. If this is not possible, compensatory habitat may be required. There is the potential for disturbance to BAP Priority habitats during construction; a CEMP should be in place and ecological surveys are required. The pipeline crosses the River Stort via a road bridge. There is the potential for disturbance to this watercourse, river habitats and associated species during construction, and potential for changes in hydrology.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-1	Construction activities are likely to increase Affinity Water's carbon footprint, with minimal operational impacts.	-1
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option will increase affinity waters storage capacity.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	?	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. There is potential for disturbance to BAP Priority habitat deciduous woodland and watercourses, including at Debden Water SSSI and the River Cam or Grant north of Thistley Hall.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water treatment in scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact/effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The new pipeline is within 10m of a Scheduled Monument as well as a significant number of Listed Buildings. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependent heritage assets would be significantly affected.	

<p>14. Minimise loss of soil quality and sterilisation of mineral resources?</p>	<p>14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?</p>		<p>High</p>	<p>N/A</p>	<p>Short term (< 5 years)</p>	<p>N/A</p>	<p>Temporary</p>	<p>N/A</p>	<p>Local</p>	<p>High</p>	<p>Mitigation measures should include full re-instatement of any land or soil affected by construction.</p>	<p>-1</p>	<p>0</p>	<p>The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.</p>	<p>0</p>
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1.1.1.15 XXXX-TR 20 20

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option may have minor negative effects on public rights of way and strategic transport infrastructure during construction phase with knock on minor effects on critical services and industries. There may also be minor negative effects during construction phase on biodiversity due to the proximity of numerous SSSI's and BAP priority habitats. The pipeline route passes within close proximity to a significant number of Listed Buildings and crosses areas of grade 2 agricultural land. Therefore it may have minor negative effects on heritage and agricultural land during construction phase. The new pipeline will be buried so is not anticipated to have negative effects on the landscape during the operational phase. However, it should be noted that a small proportion of the new pipeline passes through the Chilterns AONB and that there is the potential for minor negative effects on landscape during operation as a result of the new reservoir and pump house but this is uncertain at this stage. The pipeline crosses several river channels whose hydro morphology could potentially be impacted. Consequently there is likely to be minor negative effects on surface water body status. Additionally, there will be an increase in Affinity Water's carbon footprint due to construction and operation of this option.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 40MI/d equates to a moderate positive effect	2
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The option will require a new 15.9km 800mm diameter main from HADH to RYHI. A new pipeline of this length is likely to sever sections of public rights of way and other amenity assets. This has the potential for a temporary short term minor negative effect.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0		The option will require a new 15.9km 800mm diameter main from HADH to RYHI. This is route cuts across the A414, and A1169. There are likely to be minor temporary negative effects during construction.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	There could be minor indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option will require a new 15.9km 800mm diameter main from HADH to RYHI. This is route cuts across the A414, and A1169. There are likely to be minor temporary negative effects during construction.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	The pipeline and Boxted Pump Station are 2.6km from Chilterns Beechwoods SAC. However, due to the distance to the SAC no impacts are anticipated.	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-2	0	The option will require 4 x 250kW Booster Pumps to be installed at HADH and a new 15.9km 800mm diameter main from HADH to RYHI.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Due to the distance to the SAC no impacts are anticipated. No HRA implications identified as it is assumed that water will always be available as part of this option. However, if increased abstraction required to support this option under	0	0		?

										another scheme/option, in combination HRA may be required.			
5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Low	N/A	Medium term (5-25 years)	N/A	Temporary	N/A	Regional	Moderate	A CEMP should be implemented during construction. Ecological surveys are required.	-1	0	The pipeline and Boxted Pump Station are 1.0km from Little Heath Pit SSSI, and 2.6km from Ashridge Common and Woods SSSI. There is the potential for disturbance (light, noise, dust etc.) to designated sites during construction. A CEMP should be implemented during construction. There are also potential for changes in hydrology depending on depth of the pipeline.	
5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Medium	N/A	Medium term (5-25 years)	N/A	Temporary	N/A	Local	Low	A CEMP should be implemented during construction. Ecological surveys are required.	-1	0	The pipeline passes through one parcel of BAP Priority habitat deciduous woodland. However this is along Luton Road, and it is assumed that the woodland is on a road bridge and is not actually intersected by the pipeline. The pipeline also passes adjacent to four parcels of BAP Priority habitat deciduous woodland, within 50m of an additional two parcels of deciduous woodland and within 100m of an additional three parcels of deciduous woodland. The pipeline also passes within 50m of five parcels of good quality semi-improved grassland Priority habitat and 183m from a parcel of coastal and floodplain grazing marsh. There is the potential for disturbance (light, noise, dust etc.) to BAP Priority habitats during construction. A CEMP should be implemented during construction. There are also potential for changes in hydrology depending on depth of the pipeline.	
5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey are required.	?	?	No invasive species identified, however detailed ecological survey are required.	
5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

										planting scheme.				
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	?	Design and construction methods should follow sustainable design principles.	-1	-1	The new pipeline will be buried so is not anticipated to have negative effects on the landscape during the operational phase. However, it should be noted that a small proportion of the new pipeline passes through the Chilterns AONB and that there is the potential for minor negative effects on landscape during operation as a result of the new reservoir and pump house but this is uncertain at this stage.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-1	Construction activities are likely to increase Affinity Water's carbon footprint, with minimal operational impacts.	-1
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option will increase affinity waters storage capacity.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	?	Design and construction methods should follow sustainable design principles.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline crosses several river channels which could be adversely affected. There is potential for disturbance to BAP Priority habitat deciduous woodland and watercourses, including at Debden Water SSSI and the River Cam or Grant north of Thistley Hall.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydro morphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No water treatment in scheme	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt in this scheme	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral	

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt in this scheme	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The new pipeline is within 10m of a Scheduled Monument as well as a significant number of Listed Buildings. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependent heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.2 RTR

1.2.1.1 AFF-RTR-WRZ5-0161

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option will have minor negative effects on strategic transport infrastructure during construction with minor negative knock on effects on critical services and industries. The option will also have a minor negative effect on Affinity Waters carbon footprint. There will also be minor negative effects on the resilience of the local environment to climate change. The pipeline to Chishall Reservoir crosses a tributary of River Rhee, as such there may be minor negative effects on the hydromorphology of this river. There is also likely to be minor negative construction phase effects on heritage designations and agricultural land.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The Rhee tributary is not expected to be used for informal recreation due to lack of access and availability of alternative footpaths and rivers in local area.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The Rhee tributary is not expected to be used for informal recreation due to lack of access and availability of alternative footpaths and rivers in local area.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Well used roads will be affected by the scheme: B1039 0.85(km) and crossed, B1368 crossed. B roads assessed due to greater length affected and greater likelihood of significant congestion impacts. 100m assumed to be affected where pipeline crosses roads	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0		

4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	Upgrades to booster pumping and expansion of Reservoir will require construction of new assets.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No European sites or SSSI's will be affected.	0
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	N/A	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Pipeline 200m from BAP Priority Habitat of deciduous woodland which will not result in loss of habitats. Chishill Reservoir upgrade will result in an increase of water levels which may impact of aquatic habitats and species. Supply is not dealt with in this scheme however transfer pipeline crosses River Rhee tributaries with the potential for disturbance to water quality during construction works. Potential for impacts to aquatic habitats.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and landscape character assessments should be carried out where significant infrastructure works will be carried out.	-1	0	There is the potential for short-term temporary negative effects on landscape during the construction phase. It is predicted that there will be a residual neutral effect during operation following appropriate reinstatement of the land.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	

7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality.	0	
	8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will be likely to result in higher energy requirements during construction phase, therefore resulting in a higher carbon footprint. Operational energy use is minimal.
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	0
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licencing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline to Chishall Reservoir crosses a tributary of River Rhee and therefore could be some impact on the hydromorphology.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt in this scheme	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt in this scheme	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Sections of this option are located within a floodplain area (identified by the Environment Agency) However re-instatement measures should avoid any loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The pipeline passes within 100m of two Listed Buildings. There is potential for minor short term temporary negative effects during construction phase. However, the residual effect during operation are anticipated to be neutral.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	0

<p>14. Minimise loss of soil quality and sterilisation of mineral resources?</p>	<p>14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?</p>		<p>High</p>	<p>N/A</p>	<p>Short term (< 5 years)</p>	<p>N/A</p>	<p>Temporary</p>	<p>N/A</p>	<p>Local</p>	<p>Moderate</p>	<p>Mitigation measures should include full reinstatement of any land or soil affected by construction.</p>	<p>-1</p>	<p>0</p>	<p>The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate reinstatement and mitigation measures should result in this effect being temporary.</p>	<p>0</p>
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1.2.1.2 AFF-RTR-WRZ4-0654

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option will have minor negative effects on strategic transport infrastructure during construction with minor negative knock on effects on critical services and industries. The pipeline route is located 600m from South West London Waterbodies and within BAP priority habitat. Therefore there will be minor negative construction phase effects in regard to these. There is also likely to be both construction and operational phase effects with regards to Landscape. The option will also have a minor negative operational effect on Affinity Waters carbon footprint. There will also be minor negative effects on the resilience of the local environment to climate change. Additionally, the pipeline crosses a number of water courses. As such, there may be minor negative effects on the hydromorphology of these rivers. There is also likely to be a minor negative construction phase effect on heritage designations and a moderate negative construction phase effect on agricultural land.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 10MI/d (during peak times) equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The site is assumed to be inaccessible to the public (no public rights of way or public facilities in site footprint). Additionally, the anticipated minor impacts on water quality or flow are not anticipated to be perceptible to the majority of informal bankside recreation users. The pipeline route crosses footpaths. These footpaths are anticipated to be well used due to the surrounding population density. No significant impacts anticipated.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts predicted	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The anticipated pipeline route follows the footprints of several roads and so is anticipated to cause such impacts. However, The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0	

	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will require construction of new assets.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	National	High	CEMP should be implemented during construction due to potential for acoustic, light and dust disturbance during construction. An HRA will be required to ensure there are no likely significant effects on this European designated site.	-1	0	The pipeline route is located 600m from South West London Waterbodies Special Protection Area (SPA) and Ramsar site which is a series of waterbodies designated for supporting internationally important populations of Northern Shoveler and Gadwall. There is a potential for disturbance (noise, light, dust etc.) and potential for changes in hydrology depending on depth of pipeline. There is a potential for disturbance (noise, light, dust etc.) and potential for changes in hydrology depending on depth of pipeline. The proposed pipeline route is located 600m from Kempton Park Reservoirs SSSI. Potential for disturbance to SSSI during construction.	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Low	N/A	Medium term (5 -25 years)	N/A	Permanent	N/A	Regional	Moderate	CEMP should be implemented during construction due to potential for acoustic, light and dust disturbance during construction.	-1	0		
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Temporary	N/A	Local	Low	Ecological surveys of BAP Priority habitats are required. Loss of BAP Priority habitat should be avoided where possible. If not possible, compensatory habitat will be required. A CEMP should be in place during construction.	-1	0	The proposed pipeline route passes through BAP Priority habitat of deciduous woodland, good quality semi-improved grassland and traditional orchard. The pipeline route is also 175m from BAP Priority habitat of lowland meadows. There is potential for loss of BAP Priority habitat. There is a potential for disturbance (noise, light, dust etc.) to BAP Priority habitats during construction. Potential for changes in hydrology of BAP Priority habitats depending on depth of pipeline.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and landscape character assessments should be carried out where significant infrastructure works will be carried out.	-1	-1	The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. However, there is the potential for minor negative effects as a result of the new reservoir and pump house but this is uncertain at this stage. Mitigation measures such as screening/ planting should reduce the significance of any residual negative effects during operation so that they are minor. The pipeline route travels through multiple residential areas. Therefore, there will be short-term temporary negative effects on residents associated with pipeline excavation work of residential streets, but not domestic properties. Residents will not be affected by the pipeline during the operational phase as it will be buried. The new reservoir and pump house could also affect the landscape for a number of residents depending on the level of mitigation provided. However, this is uncertain at this stage	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High		-1	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality. However, it is noted that the pipeline route passes within the Wey AQMA. There are likely to be negative effects on air quality during construction of the new pipeline as a result of increased traffic.	-1

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	N/A	-2	-1	The storage capacity upgrade and additional mains will lead to an increase in energy use during construction and operation.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licencing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10.a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline to crosses a number of surface watercourses and therefore could be some impact on the hydromorphology.	-1
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No treatment dealt with in this scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No direct abstraction dealt with in this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No direct abstraction dealt with in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option is not located within a floodplain area (identified by the Environment Agency) and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The new pipeline passes within 10m of a significant number of Listed Buildings. Additionally, the site of the new HARR is within 100m of the Harrow Registered Park. There is therefore potential for negative effects during the construction phase. However, the burial of the pipeline and reinstatement of any land affected is anticipated to result in negative effects being short-term, temporary and not experienced during the operational phase. It is assumed that there will be appropriate mitigation to ensure that the visible infrastructure does not have a significant negative effect on the historic environment.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	

<p>14. Minimise loss of soil quality and sterilisation of mineral resources?</p>	<p>14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?</p>		<p>High</p>	<p>N/A</p>	<p>Short term (< 5 years)</p>	<p>N/A</p>	<p>Temporary</p>	<p>N/A</p>	<p>Local</p>	<p>High</p>	<p>Mitigation measures should include full re-instatement of any land or soil affected by construction.</p>	<p>-2</p>	<p>0</p>	<p>The pipeline route crosses grade 1 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.</p>	<p>0</p>
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1.2.1.3 AFF-RTR-WRZ6-0752

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Pop		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option will have minor negative effects on strategic transport infrastructure during construction with minor negative knock on effects on critical services and industries. The pipeline route may disturb BAP priority habitat, therefore there will be minor negative construction phase effects in regard to this. The option will also have a minor negative operational effect on Affinity Water's carbon footprint. There will also be minor negative effects on the resilience of the local environment to climate change. Additionally, the pipeline crosses a number of water courses. As such, there may be minor negative effects on the hydromorphology of these rivers.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.7Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The Wey River is accessible to water craft. This option is not anticipated to cause impacts to this access	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Minor impacts on water quality or flow are assumed not to impact users of boats or water craft as it is deemed unlikely that these changes would be perceived during use.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Site (the Park Barn Drive Reservoir) assumed inaccessible to the public (no public rights of way or public facilities in site footprint). No footpaths in route of pipeline. No anticipated impacts.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The anticipated pipeline route follows the footprints of several roads and so is anticipated to cause such impacts The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option requires the construction of new Mains and a reservoir upgrade.	0

	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1		The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low		-1	0	Deciduous woodland Priority habitat is located to the north, west and south of the Park Barn Drive Reservoir. The upgrade of this reservoir may lead to the loss of, or disturbance to this habitat. However, the location of the works associated with the expansion of the reservoir are not yet known. The pipeline passes 200m from a parcel of BAP Priority habitat lowland fens. The pipeline also passes within 150m of one parcel of BAP Priority habitat deciduous woodland, and within 50m of two additional parcels of this Priority habitat. There is the potential for disturbance to these habitats (through noise, light and dust) during construction. A CEMP should be in place. The pipeline crosses the River Wey via a road bridge. There is the potential for river habitats and species to be disturbed (through noise, light, dust and changes in water quality) during construction. A CEMP should be in place.	?
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?		?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The new pumping station to be located at Ladymead interconnection point, is within a built up urban area. Therefore assuming appropriate mitigation such as screening / planting - a new structure in this area should not result in a significant residual effect on landscape.	0

	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given the scale of the option and that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	N/A	Construction and operation activities should follow sustainable design principles.	-1	0	Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option is likely to increase the continuity of supply and should therefore result in positive effects on the resilience of Affinity Waters climate change resilience.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	?	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline to crosses a number of surface watercourses and therefore could be some impact on the hydromorphology.	-1
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No treatment dealt with in this scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No direct abstraction dealt with in this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction of the pumping station where there is groundwater in the superficial deposits but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No direct abstraction dealt with in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Sections of this option are located within a floodplain area (identified by the Environment Agency) However re-instatement measures should avoid any loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	There are no designated heritage assets that are likely to be affected during the construction phase. The option will not have any significant residual effects on the historic environment during the operational phase.	0								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	Mitigation measures should include a full archaeological survey on site to determine the location of potential unknown archaeological assets (where further excavation work outside of current pipe lines is required.)	0	0	At the SEA scale it is not possible to determine the potential effect on any known or unknown paleo-environmental deposits. An archaeological survey should accompany any further construction / excavation work outside of current pipe lines.								
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0								

1.2.1.4 AFF-RTR-WRZ7-0842

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option will have minor negative effects on strategic transport infrastructure during construction with minor negative knock on effects on critical services and industries. The option route passes through BAP priority habitat and the pipeline route is located 421 m from Gibbin's Brook SSSI. Consequently there is potential for minor negative construction phase effects on these biodiversity features. There is also likely to be moderate negative effects on landscape during the construction phase and a minor negative effect during operation as the reservoir expansion and part of the pipeline is located within the Kent Downs AONB. The storage capacity upgrade and additional mains will result in a minor negative effect on Affinity Water's carbon footprint during operation. Additionally, further abstraction may have a negative effect on the environment's resilience to climate change if not properly monitored and licenced. There is likely to be moderate negative effects during construction on heritage assets and minor negative effects on agricultural land during construction. Mitigation should reduce these effects to neutral during operation.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3Ml/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The East Stour river is considered accessible to small water craft. This scheme is not anticipated to cause impacts to this access. It is anticipated that the East Stour River is not used by water craft in the vicinity of anticipated impacts due to the size of the water body and availability of more navigable water bodies nearby (e.g. River Lea, downstream River Ver, Grand Union Canal).	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1	0	The anticipated minor residual impacts on water quality or flow during construction are not anticipated to be perceptible to informal bankside recreation users. The anticipated levels (minor significant impact at construction) of river water quality change are not anticipated to have material impacts on the enjoyment of in-stream recreation.	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1			0
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The anticipated pipeline route follows the footprint of major roads and so is considered likely to cause traffic impacts. The construction traffic impact is not anticipated to be a	0	

<p>5. Protect and enhance biodiversity including designated and other important habitats and species?</p>	<p>5.a. Impact on European sites?</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>If increased abstraction required to support this option under another scheme/ option, in combination HRA may be required.</p>	<p>-1</p>	<p>0</p>	<p>The proposed pipeline route is located 8.6 km from Dungeness, Romney Marsh and Rye Bay Ramsar site and Special Protection Area (SPA). The pipeline route is also 3.6 km from the Dungeness, Romney Marsh and Rye Bay Extension potential Special Protection Area (pSPA). The pipeline route is 2.6 km from Folkestone to Etchinghill Escarpment Special Conservation Area (SAC), 5.6 km from Wye & Crundale Downs SAC and 8.7 km from Crundale Downs SAC. The Pipeline is 2.2 km from Hythe Bay Marine Conservation Zone (MCZ) and 8.3 km from Dover to Folkestone MCZ. The pipeline route is located 421 m from Gibbin's Brook Site of Special Scientific Interest (SSSI), 1 km from Otterpool Quarry SSSI, 1.4 km from Seabrook Stream SSSI, 1.7 km from Lympne Escarpment SSSI, 1.7 km from Folkestone to Etchinghill Escarpment SSSI, 3.3 km from Hatch Park SSSI and 3.9 km from Great Shuttlesfield Down SSSI.</p> <p>At its closest point Saltwood reservoir is 2.1 km from Hythe Bay MCZ and 2.7 km from Folkestone to Etchinghill Escarpment SAC.</p> <p>At its closest point the interconnection point is 5.4 km from Dungeness, Romney Marsh and Rye Bay Extension SPA and Hythe Bay MCZ.</p>	<p>?</p>
	<p>5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?</p>	<p>High</p>	<p>N/A</p>	<p>Long term >25 years</p>	<p>N/A</p>	<p>Permanent</p>	<p>N/A</p>	<p>Regional</p>	<p>Moderate</p>	<p>Loss of notable habitat should be avoided if possible. If unavoidable, compensatory habitat likely to be required. Ecological survey required. A CEMP should be in place during construction to minimise potential for noise, light and dust disturbance.</p>	<p>-1</p>	<p>0</p>	<p>Potential for changes in hydrology of Gibbin's Brook SSSI depending on depth of pipeline. Also potential for acoustic, light and dust disturbance during construction. Ecology and WFD: There are potential water quality impacts to the East Stour River during construction of the pipeline, with the potential for disturbance to aquatic habitats and species. There is a potential impact to the Kent Greensand Eastern Groundwater body, through construction of the new pumping station. Potential for disturbance to protected species within woodland habitat. Potential for disturbance to aquatic species within the East Stour River during construction</p>			

	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	Low	Ecological Surveys required. A CEMP should be in place during construction to minimise potential for noise, light and dust disturbance.	-1	0	The proposed pipeline route passes through BAP Priority habitat of deciduous woodland, There is potential for loss of BAP Priority habitat. There is a potential for disturbance (noise, light, dust etc.) to BAP Priority habitats during construction. Potential for changes in hydrology of BAP Priority habitats depending on depth of pipeline.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	High	Mitigation measures should include appropriate re-instatement and screening. Heritage and landscape character assessments should be carried out where significant infrastructure works will be carried out.	-2	-1	A new pump house will be required at the interconnection point and the reservoir expansion may be partially above ground. There is the potential for a moderate negative effect during the construction phase as the reservoir expansion and part of the pipeline is located within the Kent Downs AONB. The pipeline will be buried so it will not have any residual negative effects during operation. Mitigation including screening/planting should reduce the significance of any residual negative effect on the landscape as a result of the expanded reservoir and pump house.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	N/A	-2	-1	The storage capacity upgrade and additional mains will lead to an increase in energy use during construction and operation.	-1

	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licencing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10.a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline the East Stour River and therefore could be some impact on the hydromorphology.	-1
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction of the pumping station on the Kent Greensand Eastern Groundwater body but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-2	0	The new pipeline passes within 5m of a Scheduled Monument and within 20m of a Listed Building. There is therefore potential for a moderate negative effect during the construction phase due to the proximity of the designated heritage assets. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase. It should also be noted that the existing reservoir is within 100m of two Listed Buildings. It is predicted that mitigation, including appropriate screening/planting , will result in a residual neutral effect during operation.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No known important archaeology.	

<p>14. Minimise loss of soil quality and sterilisation of mineral resources?</p>	<p>14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?</p>		<p>High</p>	<p>N/A</p>	<p>Short term (< 5 years)</p>	<p>N/A</p>	<p>Temporary</p>	<p>N/A</p>	<p>Local</p>	<p>Moderate</p>	<p>Mitigation measures should include full re-instatement of any land or soil affected by construction.</p>	<p>-1</p>	<p>0</p>	<p>The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.</p>	<p>0</p>
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1.2.1.5 AFF-RTR-WRZ5-0849

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option will have minor negative effects on strategic transport infrastructure during construction with minor negative knock on effects on critical services and industries. The option route passes 500m from BAP priority habitat and the pipeline passes 133m from Epping Forest SSSI, 1.5km from Curtismill Green SSSI and 2.2km from The Coppice Kelvedon Hatch SSSI. Consequently there is potential for minor negative construction phase effects on these biodiversity features. There is also likely to be moderate negative effects on landscape during the construction phase and a minor negative effect during operation as the reservoir expansion and part of the pipeline is located within the Kent Downs AONB. The storage capacity upgrade and additional mains will result in a minor negative effect on Affinity Water's carbon footprint during operation. Additionally, further abstraction may have a negative effect on the environment's resilience to climate change if not properly monitored and licenced. The option may also have a minor negative effect during both construction and operation on the hydro morphology of rivers which it crosses. There is likely to be minor negative effects during construction on heritage assets. Mitigation should reduce these effects to neutral during operation.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 15M/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The option may also have a minor negative effect during both construction and operation on the hydro morphology of rivers which it crosses. There is likely to be minor negative effects during construction on heritage assets. Mitigation should reduce these effects to neutral during operation.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The River Roding is accessible to water craft. This option is not anticipated to cause impacts to this access. Minor impacts on water quality or flow are assumed not to impact users of boats or water craft as it is deemed unlikely that these changes would be perceived during use. The anticipated pipeline route crosses a number of footpaths. However no significant impacts are predicted.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	The anticipated pipeline route follows the footprints of several roads and so is anticipated to cause such impacts. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	The option requires the construction of new Mains and a reservoir upgrade.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	0
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0		

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	National	High	Due to the proximity of the Option to Epping Forest SAC, an HRA will be required.	-1	0	The pipeline passes 133m from Epping Forest SAC. There is the potential for disturbance to, or changes in hydrology of, this site during construction.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Regional	Moderate	There is the potential for disturbance to, or changes in hydrology of, SSSIs during construction. A CEMP should be in place during construction and ecological surveys are required	-1	0	The pipeline passes 133m from Epping Forest SSSI, 1.5km from Curtismill Green SSSI and 2.2km from The Coppice Kelvedon Hatch SSSI. There is the potential for disturbance to, or changes in hydrology of, these sites during construction. A CEMP should be in place during construction and ecological surveys are required.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	Low	There is the potential for habitats, including ancient woodland, watercourses and BAP Priority habitats to be disturbed (through noise, dust and lighting) during construction. A CEMP should be in place. Changes in the pipeline route may avoid works adjacent to ancient woodland and BAP Priority habitats.	-1	0	The Brentwood Interconnection Point is located approximately 500m from BAP Priority habitat deciduous woodland. However, due to the distance is it not anticipated that construction of the booster pump building will have an effect on this habitat. The pipeline passes adjacent to 21 parcels of BAP Priority habitat deciduous woodland, as well as within 50m of several parcels of this habitat. The pipeline passes adjacent to 1 parcels of BAP Priority habitat good quality semi-improved grassland. The pipeline also passes 133m from ancient woodland and BAP Priority habitat deciduous woodland associated with the Epping Forest SAC and SSSI, 100m from ancient woodland at Beachet Wood and 70m from ancient woodland at Lower Boishall Wood. The pipeline also passes adjacent to ancient woodland at Bob's Barn Wood and Langford Bottom CWS, and at Heronland Shaw, Strawberry Wood and High Wood. The pipeline passes adjacent to a watercourse south of Epping and crosses watercourses to the east of Stapleford Tawney and south of Langford Bottom. There is the potential for habitats, including ancient woodland, watercourses and BAP Priority habitats to be disturbed (through noise, dust and lighting) during construction.	?
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate landscaping and re-instatement post construction of pipeline.	-1	0	At this stage it is not clear if the upgrade to the reservoir would result in any new visible infrastructure. A new pump house may be required and other minor structures. There are likely to be minor negative effects on landscape during construction phase. Appropriate mitigation such as screening/planting will reduce the residual effect during operational phase.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	0
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	N/A	Construction and operation activities should follow sustainable design principles.	-1	0	Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option is likely to increase the continuity of supply and should therefore result in positive effects on the resilience of Affinity Waters climate change resilience.	0
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	?	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline to crosses a number of surface watercourses and therefore could be some impact on the hydromorphology.	-1
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No treatment dealt with in this scheme.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No direct abstraction dealt with in this scheme.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No direct abstraction dealt with in this scheme.	0

12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Sections of this option are located within a floodplain area (identified by the Environment Agency) However re-instatement measures should avoid any loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The new pipeline passes within 10m of a number of Listed Buildings. There is also a scheduled monument located approximately 250m from the RYHI. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected as well as suitable screening/ planting should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0	
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey on site to determine the location of potential unknown archaeological assets (where further excavation work outside of current pipe lines is required.)	0	0	At the SEA scale it is not possible to determine the potential effect on any known or unknown paleo-environmental deposits. An archaeological survey should accompany any further construction / excavation work outside of current pipe lines.	0	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include full re-instatement of any land or soil affected by construction.	0	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0	

1.2.1.6 AFF-RTR-WRZ3-0860

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option will have minor negative effects on strategic transport infrastructure, and public rights of way during construction with minor negative knock on effects on critical services and industries. The new pipeline route and service reservoir at SUND is located 750m away from Smithcombe, Starpenhoe & Sundon Hills SSSI and is 300m away from Galley & Warden Hills SSSI. Additionally, it is also located within an area of BAP Priority habitat deciduous woodland. Consequently there is potential for minor negative, and moderate negative construction phase effects on these biodiversity features. The pipeline passes through the Chilterns AONB and consequently There is also likely to be major negative effects on landscape during the construction phase and a minor negative effect during operation. This option will result in a minor negative effect on Affinity Water's carbon footprint during operation. Additionally, further abstraction may have a negative effect on the environment's resilience to climate change if not properly monitored and licenced. The option may also have a minor negative effect during both construction and operation on the hydro morphology of rivers which it crosses. There is likely to be moderate negative effects during construction on heritage assets with a residual minor negative effect during operation. There is also likely to be a minor negative effect on agricultural land during construction.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 50M/d equates to a moderate positive effect.	2
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The Pipeline from SUND to PRER does not cross any water bodies. However, the proposed pipeline route crosses a number of footpaths, included the Chiltern Way footpath many times. Despite the assumption that the Chiltern Way will be temporarily (and satisfactorily) rerouted, a minor negative impact is therefore anticipated during construction.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	The option requires installation of new mains pipes between SUND and PRER. This may cause disruption to numerous minor roads, and several A roads (including the A505 and A6) during construction phase. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	The option requires installation of new mains pipes between SUND and PRER, and creation of reservoir at SUND. This will require construction of new assets.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	0	

	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None Identified	0	0	None identified	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		Low	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	Low	CEMP should be implemented during construction due to potential for acoustic, light and dust disturbance during construction.	-1	0	The new pipeline route and service reservoir at SUND is located 750m away from Smithcombe, Starpenhoe & Sundon Hills SSSI and is 300m away from Galley & Warden Hills SSSI which is also designated as a Local Nature Reserve (LNR). Wain Wood SSSI is also 300m from the proposed pipeline route. Potential for disturbance to SSSI during construction.	
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	N/A	0	0	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		High	?	Long term >25 years	?	Permanent	?	Local	Low	Loss of habitat can be avoided by small change to the pipeline route. If loss of Priority habitat cannot be avoid then compensatory habitats will be required. Disturbance can be avoided by small changes in pipeline route. CEMP should be implemented during construction due to potential for acoustic, light and dust disturbance during construction. Detailed Ecological survey required.	-1	0	The location of proposed pipeline from SUND TW is within an area of BAP Priority habitat deciduous woodland. Pipeline passes through the Chilterns AONB and passes within 19m of ancient woodland. Potential for habitat loss of hedgerows along the proposed pipeline route. Potential for noise, light and dust disturbance to these sites during construction, and potential changes in hydrology based on the depth of the pipeline during operation. Potential for loss of BAP priority habitat deciduous woodland along proposed pipeline route. Investigation required.	
	5.e. Provide opportunities for biodiversity enhancement?		?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		High	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	High	Mitigation measures should include appropriate landscaping and re-instatement post construction of pipeline.	-3	-1	The new pipeline will be buried so will not have negative effects on the landscape during the operational phase. There is also the potential for negative effects as a result of the new reservoir and pump house but this is uncertain at this stage. Given the presence of the AONB, it is considered that there is the potential for a major negative effect during construction and a minor negative effect during operation.	
	6.b. Provide opportunities for landscape enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
0															
-1															

7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?		High	High	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	N/A	Construction and operation activities should follow sustainable design principles.	-2	-1	Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation activities are likely to have a impact on the carbon footprint relative to the baseline.	-1
	8.b. Maximise the company's resilience to a changing climate?		N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity and transfer supply, this option should result in positive effects on the resilience of Affinity Waters climate change resilience.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?		N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licencing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The pipeline from SUND PS to PRER is not crossing any surface water bodies	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Not occurring in this scheme	
	10.c. Alter water table levels and amount of water within aquifers?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No pathways to aquifers in this scheme	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No pathways to aquifers in this scheme	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No pathways to surface water in this scheme	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option is not located within a floodplain area (identified by the Environment Agency) and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-2	0	The new pipeline passes within 10m of the Temple Dinsley Registered Park and Garden as well as a number of Listed Buildings. There is therefore potential for negative effects during construction phase. Reinstatement and mitigation measures should ensure no negative effects during operation of the pipeline.	0

	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At the SEA scale it is not possible to determine the potential effect on any known or unknown paleo-environmental deposits. An archaeological survey should accompany any further construction / excavation work outside of current pipe lines.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0	

1.2.1.7 AFF-RTR-WRZ1-1007

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	It is anticipated that the works will not cause significant interruptions to supply for local residents during construction. The improvement to supply infrastructure is anticipated to result in a minor long term positive impact on supply in operation. The pipeline is adjacent to a section of the South West London Waterbodies Ramsar and SPA, as well as an associated SSSI. The site is 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also within 1.5km from two additional SSSIs associated with this Ramsar and SPA, and is within 50m of two additional SSSIs not associated with the Ramsar/SPA. The abstraction and construction of the pipeline also has the potential to affect BAP Priority habitats and ancient woodland through changes in hydrology and disturbance during construction. Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase. Further abstraction may have a negative effect on the environment if not properly monitored and licenced. Predicted climatic changes in England include hotter and drier summers. This option is likely to increase the continuity of supply and should therefore result in positive effects on the resilience of Affinity Waters climate change resilience.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 50MI/d equates to a moderate positive effect.	2
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	It is anticipated that the works will not cause significant interruptions to supply for local residents during construction. The improvement to supply infrastructure is anticipated to result in a minor long term positive impact on supply in operation. The pipeline is adjacent to a section of the South West London Waterbodies Ramsar and SPA, as well as an associated SSSI. The site is 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also within 1.5km from two additional SSSIs associated with this Ramsar and SPA, and is within 50m of two additional SSSIs not associated with the Ramsar/SPA. The abstraction and construction of the pipeline also has the potential to affect BAP Priority habitats and ancient woodland through changes in hydrology and disturbance during construction. Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase. Further abstraction may have a negative effect on the environment if not properly monitored and licenced. Predicted climatic changes in England include hotter and drier summers. This option is likely to increase the continuity of supply and should therefore result in positive effects on the resilience of Affinity Waters climate change resilience.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The River Thames is accessible to water craft. This option is not anticipated to cause impacts to this access. Water craft activities are not expected to be sensitive to minor changes in water quality or water flow changes. If bathing activity occurs in the affected waterbodies (considered unlikely), then minor adverse impacts on water quality may lead to impacts on the level and enjoyment of bathing activity. The anticipated levels (minor significant impact during construction) of river water quality change are not anticipated to have material impacts on the enjoyment of in-stream recreation. No changes to access are anticipated as a result of this scheme.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	It is anticipated that the works will not cause significant interruptions to supply for local residents during construction. The improvement to supply infrastructure is anticipated to result in a minor long term positive impact on supply in operation. The pipeline is adjacent to a section of the South West London Waterbodies Ramsar and SPA, as well as an associated SSSI. The site is 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also within 1.5km from two additional SSSIs associated with this Ramsar and SPA, and is within 50m of two additional SSSIs not associated with the Ramsar/SPA. The abstraction and construction of the pipeline also has the potential to affect BAP Priority habitats and ancient woodland through changes in hydrology and disturbance during construction. Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase. Further abstraction may have a negative effect on the environment if not properly monitored and licenced. Predicted climatic changes in England include hotter and drier summers. This option is likely to increase the continuity of supply and should therefore result in positive effects on the resilience of Affinity Waters climate change resilience.	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The anticipated pipeline route follows the footprints of several roads and so is anticipated to cause such impacts. However, the construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0		

4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option requires the construction of new Mains and a reservoir upgrade.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	High	Low	Medium term (5 -25 years)	Long term >25 years	Temporary	Permanent	National	High	Due to the potential for disturbance (noise, light, dust etc.) to the site during construction, a CEMP should be in place. An HRA will be required to ensure there are no likely significant effects on the South West London Waterbodies Ramsar and SPA site.	-2	-1	The pipeline is adjacent to a section of the South West London Waterbodies Ramsar and SPA, which is also designated as Wraysbury No.1 Gravel Pit SSSI. This site is also 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also 1.3km from Wraysbury & Hythe End Gravel Pits SSSI and 1.1km from Wraysbury Reservoir SSSI, both also part of the South West London Waterbodies Ramsar and SPA. Depending on the depth of the pipeline there is the potential for changes in hydrology at the SPA/Ramsar and SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction	-1
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	High	Low	Medium term (5 -25 years)	Long term >25 years	Temporary	Permanent	Regional	Moderate	Depending on the depth of the pipeline there is the potential for changes in hydrology at the SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction, a CEMP should be in place. Ecological surveys are required.	-1	-1	The pipeline is adjacent to Wraysbury No.1 Gravel Pit SSSI. This site is also 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also 1.3km from Wraysbury & Hythe End Gravel Pits SSSI and 1.1km from Wraysbury Reservoir SSSI. There is the potential for increased abstraction from the River Thames to affect the hydrology of these sites. The pipeline is also 360m from Kingcup Meadows and Oldhouse Wood SSSI, 40m from Fray's Farm Meadows LNR and SSSI and 52m from Ruislip Woods NNR and SSSI. Depending on the depth of the pipeline there is the potential for changes in hydrology at the SSSIs. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	

		High	Low	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Low					
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?									Ecological surveys of BAP Priority habitats are required. The loss of BAP Priority habitat should be avoided where possible. Where this isn't possible, compensatory habitat may be required. There is the potential for disturbance to BAP Priority habitats and ancient woodland during construction; a CEMP should be in place. There is also the potential for changes in hydrology to coastal and floodplain grazing marsh Priority habitat due to the increased abstraction from the Thames.	-1	-1	The abstraction point is adjacent to an area of BAP Priority habitat deciduous woodland and BAP Priority habitat coastal and floodplain grazing marsh. The pipeline passes through a block of BAP Priority habitat deciduous woodland adjacent to the M4 motorway. The pipeline passes adjacent to several blocks of BAP Priority habitat deciduous woodland. The pipeline also passes 14m and 79m from two parcels of ancient woodland east of Chandlers Hill, 52m from ancient woodland at Ruislip Woods, adjacent to French Grove and Battlers Wells Wood ancient woodland and 88m from ancient woodland north of French Grove. There is the potential for disturbance to BAP Priority habitats and ancient woodland during construction; a CEMP should be in place. There is also the potential for changes in hydrology to coastal and floodplain grazing marsh Priority habitat due to the increased abstraction from the Thames.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate landscaping and re-instatement post construction of pipeline.	-1		New pipeline will be underground. New booster pumps may require an expansion of existing buildings at SUNN. HARE Expansion will most likely be partially above ground as per the existing site setup. Mitigation including screening/planting should ensure that the residual effects during operation are reduced. However, given the uncertainty over the reservoir upgrade and mitigation to provided it is assumed that there will be a minor negative effect on the landscape during operation.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality. However, it is noted that the pipeline route passes within the Hillingdon AQMA. There are likely to be negative effects on air quality during construction of the new pipeline as a result of increased traffic.	0

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	N/A	Construction and operation activities should follow sustainable design principles.	-1	0	Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option is likely to increase the continuity of supply and should therefore result in positive effects on the resilience of Affinity Waters climate change resilience.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	?	Design and construction methods should follow sustainable design principles.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline to crosses a number of surface watercourses and therefore could be some impact on the hydromorphology.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Appropriate licensing and HOF will be required.	0	-1	Abstraction in river may have a negative effect if not properly monitored and licenced. The Lower Thames Gravels groundwater body is hydraulically connected to the Thames River and might be affected by the increased abstraction.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Appropriate licensing and HOF will be required.	0	-1	Abstraction may have a negative effect if not properly monitored and licenced.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Sections of this option are located within a floodplain area (identified by the Environment Agency) However re-instatement measures should avoid any loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1		The new pipeline is within 10m of a number of Listed Buildings. There will be short term, temporary negative effects associated with construction of the pipeline. However, with appropriate mitigation and reinstatement of the affected land the residual effects during operation are predicted to be neutral.	0
	13. b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey on site to determine the location of potential unknown archaeological assets (where further excavation work outside of current pipe lines is required.)	0	0	At the SEA scale it is not possible to determine the potential effect on any known or unknown paleo-environmental deposits. An archaeological survey should accompany any further construction / excavation work outside of current pipe lines.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.2.1.8 AFF-RTR-WRZ3-1028

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	It is anticipated that the works will not cause significant interruptions to supply for local residents during construction. The improvement to supply infrastructure is anticipated to result in a minor long term positive impact on supply in operation. Pipeline passes through an area of BAP priority habitat (undefined) and passes approximately 50m from BAP priority habitat deciduous woodland. Potential for loss of, and disturbance to, priority habitats. The option will be likely to result in higher energy requirements during construction phase, therefore resulting in a higher carbon footprint. Operational energy increase is assumed to be minimal. The pipeline to WICK crosses a tributary of River Rhee and there could be some impact on the hydromorphology. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. There could be indirect negative	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 8Ml/d (peak output) equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The construction impacts are not likely to be significant as it is anticipated that the Hertfordshire Way footpath will be rerouted whilst the pipeline construction is underway. No operation impacts are anticipated.	0

	2.b. Alter water levels that affect water-based recreation assets?	effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines. The pipeline route crosses grade 3a agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts identified.		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	The option requires a new pipeline. This crosses the Hertfordshire Way footpath, amongst others. It may cause short term disruption along public rights of way during construction. Additionally, the pipeline generally follows the existing road network and may reduce pedestrian access at crossing points during construction.		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. Well used roads will be affected by the scheme: B1039 2.5km, A10 crossed by pipeline (assumed 100m affected). B roads assessed due to greater length affected and greater likelihood of significant congestion impacts.		0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.			
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	The scheme involves a new bidirectional main between WICK and LOWE, no additional infrastructure would be required.	0		
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.			
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	None identified			
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0				
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?		No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	?	?	Re-route pipeline to avoid BAP priority habitats where possible. CEMP should be in place to avoid noise, light and dust disturbance to BAP priority habitat.	-1	0		Pipeline passes through an area of BAP priority habitat (undefined) and passes approximately 50m from BAP priority habitat deciduous woodland.	?
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?		Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	There is the potential for short-term temporary negative effects on landscape during the construction phase. It is predicted that there will be a residual neutral effect during operation following appropriate reinstatement of the land.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	0
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will be likely to result in higher energy requirements during construction phase, therefore resulting in a higher carbon footprint. Operational energy increase is assumed to be minimal.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	0
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Design and construction methods should follow sustainable design principles.	0	0	Design and construction methods should follow sustainable design principles.	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline to WICK Reservoir crosses a tributary of River Rhee and there could be some impact on the hydromorphology.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt in this scheme	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt in this scheme	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is no anticipated loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	0	0	There is a Scheduled Monument approximately 550m from the proposed route for the new pipeline. It is considered unlikely that the construction phase would have any significant effects on this designated heritage asset. .	0

	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	Mitigation measures should include a full archaeological survey on site to determine the location of potential unknown archaeological assets (where further excavation work outside of current pipe lines is required.)	0	0	At the SEA scale it is not possible to determine the potential effect on any known or unknown paleo-environmental deposits. An archaeological survey should accompany any further construction / excavation work outside of current pipe lines.								
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		N/A	0	0	No impacts predicted	0								

1.2.1.9 AFF-RTR-WRZ4-1038

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	It is anticipated that the works will not cause significant interruptions to supply for local residents during construction. The improvement to supply infrastructure is anticipated to result in a minor long term positive impact on supply in operation. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. Upgrades to booster pumping the new mains will require construction of new assets and the option will temporarily result in higher levels of waste production. The pipeline is adjacent to a section of the South West London Waterbodies Ramsar and SPA, which is also designated as Wraysbury No.1 Gravel Pit SSSI. This site is also 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also 1.3km from Wraysbury & Hythe End Gravel Pits SSSI and 1.1km from Wraysbury Reservoir SSSI, both also part of the South West London Waterbodies Ramsar and SPA. Depending on the depth of the pipeline there is the potential for changes in hydrology at the SPA/Ramsar and SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction. HRA will be required. There is also the potential for BAP Priority habitats to be affected. The upgrade of Chishill Reservoir and	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 50MI/d equates to a moderate positive effect.	2
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The pipeline is also 1.3km from Wraysbury & Hythe End Gravel Pits SSSI and 1.1km from Wraysbury Reservoir SSSI, both also part of the South West London Waterbodies Ramsar and SPA. Depending on the depth of the pipeline there is the potential for changes in hydrology at the SPA/Ramsar and SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction. HRA will be required. There is also the potential for BAP Priority habitats to be affected. The upgrade of Chishill Reservoir and	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The anticipated minor residual impacts on water quality or flow are not anticipated to be perceptible to the majority of informal bankside recreation users.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	new mains is likely to result in higher energy requirements during construction phase, therefore resulting in a higher carbon footprint. Operational energy increase is assumed to be minimal. Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The anticipated pipeline route follows the footprints of several roads and so is anticipated to cause such impacts. Well used roads will be affected by the scheme: M4 0.9 (km), A4 0.1, B376 0.7, B470 1.2, Unclassified 7. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	0
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	Upgrades to booster pumping the new mains will require construction of new assets.	0
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	0
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		High	Low	Medium term (5 -25 years)	Long term >25 years	Temporary	Permanent	National	High	Due to the potential for disturbance (noise, light, dust etc.) to the site during construction, a CEMP should be in place. An HRA will be required to ensure there are no likely significant effects on this European designated site.	-2	-1	The pipeline is adjacent to a section of the South West London Waterbodies Ramsar and SPA, which is also designated as Wraysbury No.1 Gravel Pit SSSI. This site is also 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also 1.3km from Wraysbury & Hythe End Gravel Pits SSSI and 1.1km from Wraysbury Reservoir SSSI, both also part of the South West London Waterbodies Ramsar and SPA. Depending on the depth of the pipeline there is the potential for changes in hydrology at the SPA/Ramsar and SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction	-1

	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	High	Low	Long term >25 years	Long term >25 years	Permanent	Permanent	Regional	Moderate	Depending on the depth of the pipeline there is the potential for changes in hydrology at the SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction, a CEMP should be in place. Ecological surveys are required.	-2	-1	The pipeline is adjacent to Wraysbury No.1 Gravel Pit SSSI. This site is also 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also 1.3km from Wraysbury & Hythe End Gravel Pits SSSI and 1.1km from Wraysbury Reservoir SSSI. Depending on the depth of the pipeline there is the potential for changes in hydrology at the SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	Low	Medium term (5 -25 years)	Long term >25 years	Temporary	Permanent	Local	Low	Ecological surveys of BAP Priority habitats are required. The loss of BAP Priority habitat should be avoided where possible. Where this isn't possible, compensatory habitat may be required. There is the potential for disturbance to BAP Priority habitats during construction; a CEMP should be in place.	-1	-1	The pipeline passes through a block of BAP Priority habitat deciduous woodland adjacent to the M4 motorway. The pipeline passes adjacent to several blocks of BAP Priority habitat deciduous woodland. There is the potential for disturbance to BAP Priority habitats during construction. There is also the potential for changes in hydrology to coastal and floodplain grazing marsh Priority habitat due to the increased abstraction from the Thames.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and landscape character assessments should be carried out where significant infrastructure works will be carried out.	-1	0	There are likely to be short-term temporary minor negative effects on landscape during construction phase of the new pipeline. The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. The upgrade of booster pumps and existing buildings may also have a minor negative effect during construction; however, once mitigation is taking into account it is predicted that the residual effect during operation will be neutral.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	

7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality given the presence of the M25 and M4 in the vicinity of the route. However, it is noted that the route is partially within the South Bucks AQMA.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	N/A	N/A	-1	0	The option will be likely to result in higher energy requirements during construction phase, therefore resulting in a higher carbon footprint. Operational energy increase is assumed to be minimal.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	N/A	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.		
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licencing of water abstraction.	N/A	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1	
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	N/A	-1	-1	The pipeline to crosses a number of surface watercourses and therefore could be some impact on the hydromorphology.	-1	
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Appropriate licensing and HOF will be required.	N/A	0	-1	Abstraction in river may have a negative effect if not properly monitored and licenced. The Lower Thames Gravels groundwater body is hydraulically connected to the Thames River and might be affected by the increased abstraction.		
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	N/A	0	0	Potential for negative impact effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral		
11. Avoid adverse impact on surface and groundwater levels and flows?	11. a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Appropriate licensing and HOF will be required.	N/A	0	-1	Abstraction may have a negative effect if not properly monitored and licenced.	-1	
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Sections of this option are located within a floodplain area (identified by the Environment Agency) However re-instatement measures should avoid any loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0	

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Heritage impact assessment should be carried out to determine the effect of the pipeline on designated heritage assets.	-1	0	The pipeline passes within 100m of two Listed Buildings. There is potential for minor short term temporary negative effects during construction phase. However, the residual effect during operation are anticipated to be neutral.	0
	13. b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-2	0	The pipeline route crosses grade 1 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.2.1.10 AFF-RTR-WRZ4-1040

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1. a. Provide affordable access to clean water adequate to support health?	The pipeline is adjacent to a section of the South West London Waterbodies Ramsar and SPA, which is also designated as Wraysbury No.1 Gravel Pit SSSI. This site is also 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also 1.3km from Wraysbury & Hythe End Gravel Pits SSSI and 1.1km from Wraysbury Reservoir SSSI, both also part of the South West London Waterbodies Ramsar and SPA. Depending on the depth of the pipeline there is the potential for changes in hydrology at the SPA/Ramsar and SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction. HRA will be required. There is also the potential for BAP Priority habitats to be affected.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	3	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 100MI/d equates to a significant positive effect.	3
	1. b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	3		
	1. c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	3		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2. a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The River Thames is accessible to water craft. This option is not anticipated to cause impacts to this access.	0
	2. b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Water craft activities are not expected to be sensitive to minor changes in water quality or water flow changes. If bathing activity occurs in the affected waterbodies (considered unlikely), then minor adverse impacts on water quality may lead to impacts on the level and enjoyment of bathing activity.	
	2. c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No changes to access are anticipated as a result of this scheme.	

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The anticipated pipeline route follows the footprints of several roads and so is anticipated to cause such impacts. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. Well used roads will be affected by the scheme: M4 0.9 (km), A4 0.1, B376 0.7, B470 1.2, Unclassified 7.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option requires the construction of pumps, mains and surge vessels	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	High	Low	Medium term (5 -25 years)	Long term >25 years	Temporary	Permanent	National	High	Due to the potential for disturbance (noise, light, dust etc.) to the site during construction, a CEMP should be in place. An HRA will be required to ensure there are no likely significant effects on this European designated site.	-2	-1	The pipeline is adjacent to a section of the South West London Waterbodies Ramsar and SPA, which is also designated as Wraysbury No.1 Gravel Pit SSSI. This site is also 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also 1.3km from Wraysbury & Hythe End Gravel Pits SSSI and 1.1km from Wraysbury Reservoir SSSI, both also part of the South West London Waterbodies Ramsar and SPA. Depending on the depth of the pipeline there is the potential for changes in hydrology at the SPA/Ramsar and SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction	-1

		High	Low	Medium term (5-25 years)	Long term (>25 years)	Temporary	Permanent	Regional	Moderate				
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?									Depending on the depth of the pipeline there is the potential for changes in hydrology at the SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction, a CEMP should be in place. Ecological surveys are required.	-2	-1	The pipeline is adjacent to Wraysbury No.1 Gravel Pit SSSI. This site is also 160m from the River Thames at its closest, 440m from the abstraction point. The pipeline is also 1.3km from Wraysbury & Hythe End Gravel Pits SSSI and 1.1km from Wraysbury Reservoir SSSI. Depending on the depth of the pipeline there is the potential for changes in hydrology at the SSSIs. There is also the potential for increased abstraction from the River Thames to affect the hydrology of the sites. There is also the potential for disturbance (noise, light, dust etc.) to the site during construction
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	Low	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Low	Ecological surveys of BAP Priority habitats are required. The loss of BAP Priority habitat should be avoided where possible. Where this isn't possible, compensatory habitat may be required. There is the potential for disturbance to BAP Priority habitats during construction; a CEMP should be in place.	-1	-1	The abstraction point is adjacent to an area of BAP Priority habitat deciduous woodland and BAP Priority habitat coastal and floodplain grazing marsh. The pipeline passes through a block of BAP Priority habitat deciduous woodland adjacent to the M4 motorway. The pipeline passes adjacent to several blocks of BAP Priority habitat deciduous woodland. There is the potential for disturbance to BAP Priority habitats during construction. There is also the potential for changes in hydrology to coastal and floodplain grazing marsh Priority habitat due to the increased abstraction from the Thames.
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate landscaping and re-instatement post construction of pipeline.	-1	0	There are likely to be short-term temporary minor negative effects on landscape during construction phase of the new pipeline. The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. The upgrade of booster pumps and existing buildings may also have a minor negative effect during construction; however, once mitigation is taking into account it is predicted that the residual effect during operation will be neutral.
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).

7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality given the presence of the M25 and M4 in the vicinity of the route. However, it is noted that the route is partially within the South Bucks AQMA.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	N/A	Construction and operation activities should follow sustainable design principles.	-2	-2	The construction and operation of pumps, mains and surge vessels will require significant increase Affinity Water's carbon footprint.	-2
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity and transfer supply, this option should result in positive effects on the resilience of Affinity Waters climate change resilience.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	?	Design and construction methods should follow sustainable design principles.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline to crosses a number of surface water courses and therefore could be some impact on the hydromorphology.	-1
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Appropriate licensing and HOF will be required.	0	0	Abstraction in river may have a negative effect if not properly monitored and licenced. The Lower Thames Gravels groundwater body is hydraulically connected to the Thames River and might be affected by the increased abstraction.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Appropriate licensing and HOF will be required.	0	0	Abstraction may have a negative effect if not properly monitored and licenced.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Sections of this option are located within a floodplain area (identified by the Environment Agency) However re-instatement measures should avoid any loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.			The new pipeline is within 10m of approximately three Listed Buildings. There is therefore potential for minor negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey on site to determine the location of potential unknown archaeological assets (where further excavation work outside of current pipe lines is required.)	0	0	At the SEA scale it is not possible to determine the potential effect on any known or unknown paleo-environmental deposits. An archaeological survey should accompany any further construction / excavation work outside of current pipe lines.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-2	0	The pipeline route crosses grade 1 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.2.1.11 AFF-RTR-WRZ5-1047

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This scheme is a like-for-like trade of water between Affinity Water and Anglian Water. A new 30km 400mm diameter from Braintree to SIBR will be required along with 4 x 75kW pumps to be installed at Braintree. A 10Ml upgrade of SIBR is also required. There may be minor short term negative residual effects during construction on public rights of way and transport corridors which in turn may negatively effect critical infrastructure and services. There may also be negative effects on the High Wood SSSI from construction. Surface water bodies might be affected during construction where the pipeline crosses river beds. There will be likely to be significantly negative impacts on heritage assets due to their proximity to the proposed route. The route may also travel through grade 2 agricultural land.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 10Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	This option should provide positive impacts in terms of Affinity Water's resilience to climate change. This option is likely to increase the continuity of supply and should therefore result in positive effects on the resilience of Affinity Waters climate change resilience. The pipeline crosses several river channels whose hydro morphology	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts on navigability of rivers or covered reservoir.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is anticipated that any impacts from installation of new main would have minor impacts during construction and no lasting impacts during operation. It is anticipated that these changes would not be perceived by	

	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	N/A	Construction and operation activities should follow sustainable design principles.	-1	0	Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option is likely to increase the continuity of supply and should therefore result in positive effects on the resilience of Affinity Waters climate change resilience.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	?	Design and construction methods should follow sustainable design principles.	-1	0	A like-for-like trade of water between Affinity Water and Anglian Water. Therefore, no additional water should be abstracted from the environment, however the pipeline has potential to impact on river channels and is adjacent to a SSSI.	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydromorphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt with in this scheme	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction where surface water and groundwater are hydraulically connected but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction not dealt in this scheme	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Sections of this option are located within a floodplain area (identified by the Environment Agency) However re-instatement measures should avoid any loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full reinstatement of any land affected by construction.	-2	0	The new transfer route is within 50m of a Scheduled Monument and Registered Park and Garden as well as within 50m of a significant number of Listed Buildings. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term and not experienced during the operational phase.	0
	13. b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey on site to determine the location of potential unknown archaeological assets (where further excavation work outside of current pipe lines is required.)	0	0	At the SEA scale it is not possible to determine the potential effect on any known or unknown paleo-environmental deposits. An archaeological survey should accompany any further construction / excavation work outside of current pipe lines.	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include full reinstatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate reinstatement and mitigation measures should result in this effect being temporary.	0

1.2.1.12 AFF-RTR-WRZ1-1066

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	It is anticipated that the works will not cause significant interruptions to supply for local residents during construction. The improvement to supply infrastructure is anticipated to result in a minor long term positive impact on supply in operation. The abstraction and installation of pumps have the potential to affect river habitats and associated species, through disturbance (light, noise, pollution etc.) and changes in water quality. This has the potential to occur during construction. Assuming standard practices to prevent entrapment of river species during abstraction are implemented, no operational effect is anticipated. There is the potential for disturbance (through noise, light, dust etc.) to BAP Priority habitats during construction. A CEMP should be in place and ecological surveys are required. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2M/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is expected that the River Grand Union Canal is well used by water craft. This option is not expected to have an impact on this.	0

	2.b. Alter water levels that affect water-based recreation assets?	during operation. There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines. The option requires the construction of new Mains and a reservoir upgrade. The option will temporarily result in higher levels of waste production. There are likely to be moderate negative effects on landscape during construction phase. Mitigation measures such as screening/planting will reduce the residual effect of the new treatment works and visible infrastructure during operational phase. It should be noted that the Chilterns AONB is approximately 600m from this option. At this stage it is not clear if there are any significant views from the AONB to the new visible infrastructure. Listed building just over 200m from the new treatment works and expanded reservoir. There are three listed buildings within 90m of the new pipeline. Potential for a minor negative effect during construction of the new visible infrastructure and pipeline.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The anticipated levels (minor significant impact at construction) of river water quality change are not anticipated to have material impacts on the enjoyment of in-stream recreation.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The Grand Union Canal is accessible to water craft. This scheme is not anticipated to cause impacts to this access.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The anticipated pipeline route follows the footprints of several roads and so is anticipated to cause such impacts. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option requires the construction of new Mains and a reservoir upgrade.	0
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None required	0	0	The Option is 2.5km from Chilterns Beechwoods SAC. However, due to this distance and the nature of the SAC, no effects are anticipated.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None required	0	0	The Option is 1.0km from Little Heath Pit SSSI. However, due to the distance and the nature of the SSSI, no effects are anticipated.	?
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	A CEMP should be in place during construction and ecological surveys are required.	-1	0	The pipeline is 296m from a parcel of ancient woodland. The pipeline is also passes adjacent to three parcels of BAP Priority habitat deciduous woodland, and is within 300m of four additional parcels of this habitat. The proposed new treatment works is adjacent to one parcel of BAP Priority habitat deciduous woodland, and is 65m from a parcel of BAP Priority habitat traditional orchard. There is the potential for disturbance (through noise, light, dust etc.) to BAP Priority habitats during construction. A CEMP should be in place and ecological surveys are required. The abstraction and installation of pumps has the potential to affect river habitats and associated species, through disturbance (light, noise, pollution etc.) and changes in water quality. This has the potential to occur during construction. A CEMP should be in place during construction and ecological surveys are required. Assuming standard practices to prevent entrapment of river species during abstraction are implemented, no operational effect is anticipated.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Regional	High	Mitigation measures should include appropriate landscaping and re-instatement post construction of pipeline.	-2	-1	There are likely to be moderate negative effects on landscape during construction phase. Mitigation measures such as screening/planting will reduce the residual effect of the new treatment works and visible infrastructure during operational phase. It should be noted that the Chilterns AONB is approximately 600m from this option. At this stage it is not clear if there are any significant views from the AONB to the new visible infrastructure.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	N/A	Construction and operation activities should follow sustainable design principles.	-1	0	Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option is likely to increase the continuity of supply and should therefore result in positive effects on the resilience of Affinity Waters climate change resilience.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	?	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10.a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The Grand Union Canal is an artificial water body and therefore will not be affected.	0
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No treatment considered within option	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impact on aquifers	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction of reservoir treatment works where located on Mid Chilterns Chalk groundwater body but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The Grand Union Canal is an artificial water body and therefore will not be affected.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Sections of this option are located within a floodplain area (identified by the Environment Agency) However re-instatement measures should avoid any loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	Listed building just over 200m from the new treatment works and expanded reservoir. There are three listed buildings within 90m of the new pipeline. Potential for a minor negative effect during construction of the new visible infrastructure and pipeline. Mitigation including planting/screening should reduce the significance of residual negative effects during operation.	0

	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	Mitigation measures should include a full archaeological survey on site to determine the location of potential unknown archaeological assets (where further excavation work outside of current pipe lines is required.)	0	0	At the SEA scale it is not possible to determine the potential effect on any known or unknown paleo-environmental deposits. An archaeological survey should accompany any further construction / excavation work outside of current pipe lines.								
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		N/A	0	0	N/A	0								

1.2.1.13 AFF-RTR-WRZ3-1067

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option requires a new 50 MI service reservoir at SUND, a new pumping station from SUND WTW to the service reservoir (4 x 30 kW Booster Pumps) and new booster pumps for transfer to PRER (4 x 55 kW) and 27.1 km of new 800 mm diameter transfer main from SUND WTW to BUGR. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 50MI/d equates to a moderate positive effect. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. It is anticipated that works traffic will be timed to avoid congestion impacts. There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines. The option will temporarily result in higher levels of waste production. The new pipeline route and service reservoir at SUND is located 750m away from Smithcombe, Starpenhoe & Sundon Hills SSSI and is 300m away from Galley & Warden Hills SSSI which is also designated as a Local Nature Reserve (LNR). Wain Wood SSSI is also 300m from the proposed pipeline route. The pipeline route also passes adjacent to Knebworth Woods SSSI. Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation phase effects are likely to	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 50MI/d equates to a moderate positive effect.	2
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	2		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. It is anticipated that works traffic will be timed to avoid congestion impacts. Well used roads will be affected by the scheme: A1 0.1(km), B197 0.1, B656 3.1, B651 0.1, A505 0.1, A6 0.1, Unclassified 3.4.	0

	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	increase the footprint, although currently this is not expected to be a significant increase. The pipeline also passes 600m from Mardley Heath LNR. There is the potential for disturbance (through noise, light, dust etc.) to designated sites within approximately 500m during construction. The proposed pipeline passes through BAP Priority habitat of deciduous woodland including woodland at Haycock Spinney, Icknield Way, and at BUGR. BUGR is also adjacent to BAP Priority habitat deciduous woodland to the north and east, which may be lost depending on the direction of the expansion. The pipeline also passes within approximately 100m of several other parcels of BAP Priority habitat, including deciduous woodland and traditional orchard habitats. New visible infrastructure within the Chilterns AONB. Potential for a moderate negative effect during construction of the new infrastructure. Potential for a minor negative effect during operation once mitigation it taken into account.	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-2	0	This scheme requires an new 50 MI service reservoir at SUND, a new pumping station from SUND WTW to the service reservoir (4 x 30 kW Booster Pumps) and new booster pumps for transfer to PRER (4 x 55 kW) and 27.1 km of new 800 mm diameter transfer main from SUND WTW to BUGR.	0
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		Low	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	Low	CEMP should be implemented during construction due to potential for acoustic, light and dust disturbance during construction.	-1	0	The new pipeline route and service reservoir at SUND is located 750m away from Smithcombe, Starpenhoe & Sundon Hills SSSI and is 300m away from Galley & Warden Hills SSSI which is also designated as a Local Nature Reserve (LNR). Wain Wood SSSI is also 300m from the proposed pipeline route. The pipeline route also passes adjacent to Knebworth Woods SSSI. The pipeline also passes 600m from Mardley Heath LNR. There is the potential for disturbance (through noise, light, dust etc.) to designated sites within approximately 500m during construction; therefore a CEMP should be implemented during construction and ecological surveys are required.	
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		Low	N/A	Medium term (5-25 years)	N/A	Temporary	N/A	Local	Low	CEMP should be implemented during construction due to potential for acoustic, light and dust disturbance during construction.	-1	0	The proposed pipeline passes through BAP Priority habitat of deciduous woodland including woodland at Haycock Spinney, Icknield Way, and at BUGR. BUGR is also adjacent to BAP Priority habitat deciduous woodland to the north and east, which may be lost depending on the direction of the expansion. The pipeline also passes within approximately 100m of several other parcels of BAP Priority habitat, including deciduous woodland and traditional orchard habitats. The pipeline route passes adjacent to seven parcels of Ancient Woodland, and within approximately 100m of approximately five additional Ancient Woodland parcels. The pipeline crosses a ditch to the north-west of BUGR. The Option potentially passes through hedgerow habitats. The loss of notable habitat should be avoided if possible. If unavoidable, compensatory habitat is likely to be required. There is the potential for disturbance (through noise, light, dust etc.) to BAP Priority habitats during construction, a CEMP should be implemented during construction and ecological surveys are required.	
	5.e. Provide opportunities for biodiversity enhancement?		?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		High	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Regional	High	Mitigation measures should include appropriate landscaping and re-instatement post construction	-2	-1	New visible infrastructure within the Chilterns AONB. Potential for a moderate negative effect during construction of the new infrastructure. Potential for a minor negative effect during operation once mitigation it taken into account.	-1
	6.b. Provide opportunities for landscape enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	N/A	Construction and operation activities should follow sustainable design principles.	-3	-1	Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option is likely to increase the continuity of supply and should therefore result in positive effects on the resilience of Affinity Waters climate change resilience.	-1
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No abstraction within option	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Pipeline option does not cross any water bodies	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No treatment covered in option	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No abstraction within option	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No aquifers affected by option	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No abstraction within option	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Sections of this option are located within a floodplain area (identified by the Environment Agency) However re-instatement measures should avoid any loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The new pipeline is within 10m of a significant number of Listed Buildings and passes close to two Registered Parks and Gardens. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase. The new pipeline is within 10m of a significant number of Listed Buildings and passes close to two Registered Parks and Gardens. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the	0

1.2.1.14 AFF-RTR-WRZ6-1094

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	No new infrastructure is required with this scheme as it is a reduction to the existing treated water export that will only involve decommission. Abstraction is not dealt in this scheme. No HRA implications identified as existing infrastructure will be used for the reduction to the existing treated water export EGHS to South East Water at Surrey Hills. However, if abstraction is required to support this option under another scheme/ option, in combination HRA may be required. There are no other anticipated impacts as no infrastructure change.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 10MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	No anticipated impacts as no infrastructure change.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	No anticipated impacts as no infrastructure change.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	No anticipated impacts as no infrastructure change.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	No HRA implications identified as existing infrastructure will be used for the reduction to the existing treated water export EGHS to South East Water at Surrey Hills. However, if abstraction is required to support this option under another scheme/ option, in combination HRA may be required.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - existing infrastructure to be used for the reduction to the existing treated water export EGHS to South East Water at Surrey Hills.	?

	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A - existing infrastructure to be used for used for the reduction to the existing treated water export EGHS to South East Water at Surrey Hills.	0	0									
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A - existing infrastructure to be used for used for the reduction to the existing treated water export EGHS to South East Water at Surrey Hills.	0	0	N/A - existing infrastructure to be used for used for the reduction to the existing treated water export EGHS to South East Water at Surrey Hills.								
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	N/A - existing infrastructure to be used for used for the reduction to the existing treated water export EGHS to South East Water at Surrey Hills.. However may be opportunities for planting of native planting attractive to pollinators.	?	?	N/A - existing infrastructure to be used for used for the reduction to the existing treated water export EGHS to South East Water at Surrey Hills. However may be opportunities for planting of native planting attractive to pollinators.
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	0	0	This scheme is a reduction of an existing treated water export supply - there is no new infrastructure required.								
	6.b. Provide opportunities for landscape enhancement?	N/A	0	0	This scheme is a reduction of an existing treated water export supply - there is no new infrastructure required.								
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	0	0	This scheme is a reduction of an existing treated water export supply - there is no new infrastructure required. Therefore, no AQMAs will be affected.								
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	N/A	0	0	This scheme will not result in an increase in energy use.								
	8.b. Maximise the company's resilience to a changing climate?	N/A	0	0	No anticipated impacts as no infrastructure change.								
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	0	0	No anticipated impacts as no infrastructure change.								
10. Protect and improve surface and groundwater body status?	10.a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	0	0	No anticipated impacts as no infrastructure change.								
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	No anticipated impacts as no infrastructure change.								
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	No anticipated impacts as no infrastructure change.								
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	No anticipated impacts as no infrastructure change.								
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	No anticipated impacts as no infrastructure change.								
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	No anticipated impacts as no infrastructure change.								

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	No anticipated impacts as no infrastructure change.									
	13. b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	No anticipated impacts as no infrastructure change.									
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	No anticipated impacts as no infrastructure change.	0								

1.2.1.15 AFF-RTR-WRZ7-0639

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	No new infrastructure is required with this scheme as it is a reduction to the existing treated water export that will only involve decommission. Abstraction is not dealt in this scheme. No HRA implications identified as existing infrastructure will be used for the reduction to the existing treated water export EGHS to South East Water at Surrey Hills. However, if abstraction is required to support this option under another scheme/ option, in combination HRA may be required. There are no other anticipated impacts as no infrastructure change.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.74Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

1.2.1.16 AFF-RTR-WRZ7-0909

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	No new infrastructure is required with this scheme as it is a reduction to the existing treated water export that will only involve decommission. Abstraction is not dealt in this scheme. No HRA implications identified as existing infrastructure will be used for the reduction to the existing treated water export EGHS to South East Water at Surrey Hills. However, if abstraction is required to support this option under another scheme/ option, in combination HRA may be required. There are no other anticipated impacts as no infrastructure change.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No anticipated impacts as no infrastructure change.	0
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	5.c. Impact on non-native species?		?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	0	0	No anticipated impacts as no infrastructure change.								
	5.e. Provide opportunities for biodiversity enhancement?									0	0	No anticipated impacts as no infrastructure change.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	0	0	No anticipated impacts as no infrastructure change.	0							
	6.b. Provide opportunities for landscape enhancement?	N/A	0	0	No anticipated impacts as no infrastructure change.								
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	0	0	No anticipated impacts as no infrastructure change.								
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	N/A	0	0	No anticipated impacts as no infrastructure change.	0							
	8.b. Maximise the company's resilience to a changing climate?	N/A	0	0	No anticipated impacts as no infrastructure change.								
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	0	0	No anticipated impacts as no infrastructure change.	0							
10. Protect and improve surface and groundwater body status?	10.a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	0	0	No anticipated impacts as no infrastructure change.	0							
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	No anticipated impacts as no infrastructure change.								
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	No anticipated impacts as no infrastructure change.								
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	No anticipated impacts as no infrastructure change.								
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	No anticipated impacts as no infrastructure change.	0							
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	No anticipated impacts as no infrastructure change.								
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	No anticipated impacts as no infrastructure change.	0							
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	No anticipated impacts as no infrastructure change.								
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	No anticipated impacts as no infrastructure change.	0							

1.2.1.17 AFF-RTR-WRZ7-0301

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2MI/d equates to a minor positive effect. The option requires an upgrade to Chalksole Service Reservoir. This will result in the provision of a similar structure to the existing reservoir (i.e. above ground concrete tank structure), but expanded outwards to increase capacity. The site is located within the Kent Downs AONB, and the expansion of the reservoir has the potential for a moderate negative effect during construction and a residual minor negative effect during operation. Further abstraction may have a negative effect on the environment if not properly monitored and licenced - and will therefore have a minor negative operational phase effect.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Reservoir site assumed inaccessible to the public (no public rights of way or public facilities in site footprint).	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	It is assumed that the upgrade to Chalksole Green reservoir will result in the provision of a similar structure to the existing reservoir (i.e. above ground concrete tank structure), but expanded outwards to increase capacity.	0
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0		

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No HRA implications identified due to the distances involved, however if increased abstraction required to support this option under another scheme/ option, in combination HRA may be required.	0	0	Chalksole Green Service Reservoir that requires an upgrade is located 3.4km west of Lydden and Temple Ewell Downs SAC. No HRA implications identified due to the distances involved and as it is assumed that water will always be available as part of this option.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No HRA implications identified due to the distances involved.	0	0	Chalksole Green Service Reservoir that requires an upgrade is located 590m south east of Lydden and Swingfield Woods SSSI.	
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Low	There is likely to be significant loss of ancient deciduous woodland BAP Priority Habitat for the expansion of the reservoir. Loss of notable BAP Priority Habitat should be avoided if possible. If unavoidable, compensatory habitat likely to be required. It should be noted that opposition to loss of ancient woodland could be a considerable constraint to the reservoir expansion given any loss is unlikely to be minimal. Detailed ecological surveys required. A CEMP should be implemented during construction to minimise potential for noise, light and dust disturbance.	-2	0	Chalksole Green Service Reservoir that requires an upgrade is surrounded by ancient deciduous woodland Priority Habitat which is also listed as Ancient and Semi-Natural Woodland. There is potential for works to result in considerable loss of habitat. Potential indirect impacts include acoustic, light and dust disturbance during construction.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Regional	High	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-2	-1	The option requires an upgrade to Chalksole Service Reservoir. This will result in the provision of a similar structure to the existing reservoir (i.e. above ground concrete tank structure), but expanded outwards to increase capacity. The site is located within the Kent Downs AONB, and the expansion of the reservoir has the potential for a moderate negative effect during construction and a residual minor negative effect during operation.	-1

	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given the scale of the scheme and that it is not within any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The construction and operation of pumps, mains and surge vessels will require significant increase Affinity Water's carbon footprint.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity and transfer supply, this option should result in positive effects on the resilience of Affinity Waters climate change resilience.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	?	Design and construction methods should follow sustainable design principles.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10.a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Heritage impact assessment should be carried out to determine the effect of the pipeline or new structures on designated heritage assets.	-1	0	There are two listed buildings approximately 200m from the reservoir upgrade site. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0

	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey on site to determine the location of potential unknown archaeological assets (where further excavation work outside of current pipe lines is required.)	0	0	At the SEA scale it is not possible to determine the potential effect on any known or unknown paleo-environmental deposits. An archaeological survey should accompany any further construction / excavation work outside of current pipe lines.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High		Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

1.2.1.18 AFF-RTR-WRZ4-1029

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 10MI/d equates to a minor positive effect. Because this is a contractual agreement for an inter-company water transfer with the use of existing infrastructure, there are no other effects predicated.	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 10MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Permanent	Local	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

	5.c. Impact on non-native species?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								
	5.e. Provide opportunities for biodiversity enhancement?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0							
	6.b. Provide opportunities for landscape enhancement?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0							
	8.b. Maximise the company's resilience to a changing climate?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0							
10. Protect and improve surface and groundwater body status?	10.a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0							
	10.b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								

	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0							
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0							
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.								
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A - This is a contractual agreement for an inter-company water transfer with the use of existing infrastructure.	0							

1.3 EFF

1.3.1.1 AFF-EFF-WRZ7-0910

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option will have minor negative construction phase effects on the strategic transport network with minor negative knock on effects on critical services and industries. It is assumed that the option will result in the loss of BAP priority deciduous woodland. Assuming appropriate mitigation and compensatory habitat measures, there will be a moderate negative construction phase effect. A proportion of the new pipeline runs adjacent to the Kent Downs AONB, and the new reservoir will have a residual operation effect on landscape. Consequently it is likely there will be minor negative effects on landscape during construction and operation. The option requires new infrastructure and will therefore result in a minor negative effect on Affinity Water's carbon footprint. With regards to the local environment's resilience to climate change, further abstraction may have a minor negative operational effect. The option may also have a minor negative operational phase effects on surface water bodies with regards to naturalisation and quality of water. There may also be a minor negative effect on heritage assets and agricultural land during construction phase.	N/A	High	N/A	Medium term (5-25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 4M/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5-25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5-25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The anticipated pipeline route passes through farmland and some road footprints and so is anticipated to cause such impacts. Well used roads will be affected by the scheme: A2 0.1 (km), A258 1.6. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	N/A	-1	0	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	This option requires a river intake and pumping station at Marden Ash (River Roding), a new fully bunded bankside storage reservoir located at Birds Green, an onsite Water Treatment works and pumping station. Additionally, it will require 32.2km of mains pipeline to RYHI.	0

	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CEMP should be implemented during construction. No HRA implications identified given the sensitivity of the designated site.	?	?	The proposed pipeline is 4.4km from Thanet Coast & Sandwich Bay Ramsar site and Special Protection Area (SPA). The proposed pipeline is 814m from Dover to Kingsdown Cliffs Special Area of Conservation (SAC), 3.8km from Lydden & Temple Ewell Dows SAC and 5.9km from Sandwich Bay SAC. Potential for acoustic, light and dust disturbance during construction.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No mitigation required.	0	0	The proposed pipeline is 722m from Dover to Kingsdown Cliffs Site of Special Scientific Interest (SSSI), 3.1km from Folkestone Warren SSSI, 3.7km from Alkham, Lydden and Swingfield Woods SSSI, 3.8km from Lydden and Temple Ewell Downs SSSI and 4.4km from Sandwich Bay to Hacklinge Marshes SSSI. Given the distance and sensitivity of the closest designated site, Dover to Kingsdown Cliffs SSSI, and the proposed pipeline route no adverse impacts are anticipated.	?
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	High	Avoid loss of BAP Priority habitat if possible. If not possible, compensatory habitat may be required. CEMP should be in place during construction.	-1	0	The proposed pipeline route passes through BAP Priority habitat deciduous woodland. The proposed pipeline also intersects hedgerow habitat.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-1	-1	It should be noted that a proportion of the new pipeline runs adjacent to the Kent Downs AONB. There are likely to be short-term temporary minor negative effects on landscape during construction phase of the new pipeline. The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. There is the potential for minor negative effects during construction and operation as a result of the upgraded reservoir. Mitigation could help to reduce the significance of the effect during operation but this is uncertain at this stage.	-1

	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant. No significant impacts on air quality are predicted during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	This options requires significant new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on Affinity Water's carbon footprint.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.		2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Construction of increased diameter mains and increased capacity reservoir not likely to impact on groundwater levels during construction due to depth to groundwater.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Best construction practice	0	0	Potential for negative impact effect during construction of mains and works to increase reservoir capacity but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No surface watercourses identified nearby. Construction of increased diameter mains and increased capacity reservoir not likely impact on water levels during construction due to depth to groundwater.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Heritage impact assessment should be carried out to determine the effect of the pipeline and in particular the new reservoir on designated heritage assets.	-1	0	The new pipeline passes within close proximity to three Listed Buildings. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase. Once mitigation has been taken into account it is considered unlikely that the upgraded reservoir will result in a significant negative effect on the historic environment during operation.	0
	13. b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipelines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full reinstatement of any land or soil affected by construction.	-1	0	The pipeline route crosses an area of grade 2 agricultural land. Therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate reinstatement and mitigation measures should result in this effect being temporary.	0

1.4 TPO

1.4.1.1 AFF-TPO-WRZ3-0134

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The pipeline route is anticipated to follow the footprint of major roads. As such, this option will have minor negative construction phase effects on strategic transport infrastructure with knock on negative effects on critical services and industries. The pipeline also passes adjacent to BAP priority habitat, and consequently there are likely to be minor negative effects on this biodiversity feature during both construction and operation. This option requires additional pumping and treatment of water, and consequently it will have moderate negative construction phase, and minor negative operation phase effect on Affinity Water's carbon footprint. Further abstraction may also have a minor negative operational effect on the resilience of the local environment to climate change, and have minor negative operation effects on ground water and surface water bodies. The option will also have a minor negative effect on heritage assets during construction.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The pipeline route is anticipated to follow the footprint of major roads. As such, this option will have minor negative construction phase effects on strategic transport infrastructure with knock on negative effects on critical services and industries. The pipeline also passes adjacent to BAP priority habitat, and consequently there are likely to be minor negative effects on this biodiversity feature during both construction and operation. This option requires additional pumping and treatment of water, and consequently it will have moderate negative construction phase, and minor negative operation phase effect on Affinity Water's carbon footprint. Further abstraction may also have a minor negative operational effect on the resilience of the local environment to climate change, and have minor negative operation effects on ground water and surface water bodies. The option will also have a minor negative effect on heritage assets during construction.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Water craft activities are not expected to be sensitive to minor changes in water quality or water flow changes. If bathing activity occurs in the affected waterbodies (considered unlikely), then minor adverse impacts on water quality may lead to impacts on the level and enjoyment of bathing activity. The anticipated minor residual impacts on the River Lee's water quality or flow are not anticipated to be perceptible to informal recreation users. WTW site assumed inaccessible to the public (no public rights of way or public facilities in site footprint). Road footpaths not assumed to be used recreationally. The upgrade to the pipeline follows the route of existing roads, and so no accessible informal recreation sites are anticipated to be affected during construction or operation.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The pipeline route is anticipated to follow the footprint of major roads and so is considered likely to cause such impacts. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. It is anticipated that works traffic will be timed to avoid congestion impacts.	0

	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	The option requires upgrades to the Hart Lane WTW and new Booster Pumps.	0
	4.b. Result in higher levels of reuse of waste?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None required	0	0	The Lee Valley SPA is approximately 34.5km downstream of the abstraction point. Due to this distance, no effect is anticipated.	-1
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None required	0	0	None identified	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	Low	Short term (< 5 years)	?	Temporary	?	Local	Low	There is the potential for disturbance (through noise, dust, light etc.) to Priority habitats and the River Lee during construction. A CEMP should be in place during construction. There is the potential for changes to water quality in the River Lee during operation. Although abstraction will be within the current licence, the EA have expressed some concern with regards to the WFD status of the River Lee. Therefore ecology surveys are required.	-1	-1	The pipeline passes adjacent to an area of good quality semi-improved grassland BAP Priority habitat. The pipeline also passes 150m from two parcels of deciduous woodland BAP Priority habitat, and 300m from two parcels of deciduous woodland BAP Priority habitat. The pipeline also passes adjacent to the River Lee at Luton. The abstraction site is 597m from the River Lee, which may be affected by increased abstraction from the boreholes during operation, leading to changes in water quality. This would still be within the existing licence, however the EA has expressed some concern with regards to the WFD status of the River Lee. Therefore this Option is assessed as having a potential negative operational effect on the River Lee, and ecology surveys are required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and landscape character assessments should be carried out where significant infrastructure works will be carried out.	-1	0	There are likely to be minor negative effects on landscape during construction phase. Mitigation measures such as screening/planting will reduce the residual effect during operational phase and the pipeline will be buried.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	N/A	-2	-1	The option requires additional pumping, treatment and mains are likely to result in increased energy use during construction and operation.. This will lead to an increase in energy use and carbon footprint during construction and operation.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licencing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake assessment of potential effect of increased abstraction on groundwater and surface water. Implement groundwater level monitoring and trigger levels.	0	-1	The option involves an abstraction increase. Although within licence the EA expressed concerns on the potential for this to have a minor negative effect on the relevant water bodies, however at this stage the significance of this effect is uncertain.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake borehole integrity check, especially if using old boreholes. Make sure headworks are properly sealed to surface water run off.	0	0	Potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential effect on surface water where the Chalk contributes to surface water base flow in the River Lee surface water body.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option is not located on floodplain, and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	There is one Listed Building located within 20m of the proposed pipeline route. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts predicted	0

1.4.1.2 AFF-TPO-WRZ4-0412

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The pipeline route is anticipated to follow the footprint of major roads. As such, this option will have minor negative construction phase effects on strategic transport infrastructure with knock on negative effects on critical services and industries. The pipeline route passes within an AQMA therefore it is assumed there are likely to be minor negative effects on air quality during construction. Furthermore, there are likely to be minor negative effects on landscape during construction phase. This option will also have a minor negative construction phase effect on Affinity Water's carbon footprint. Further abstraction may also have a minor negative operational effect on the resilience of the local environment to climate change.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.55Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The rivers Fray and Colne Brook are not anticipated to be affected by the pipeline construction as they are at the western extreme of the assumed 2000m radius for potential pipeline impacts. A small watercourse (River Pinn) closer to Hillingdon Hospital is not anticipated to be suitably sized or accessible for in-stream recreation. No significant changes to surface water flow or quality are anticipated. The potential construction impacts on footpaths are anticipated to be insignificant as it is anticipated that the footpaths will be rerouted whilst the pipeline construction is underway. No operation impacts are anticipated. The pipeline route is not yet identified but may cross a number of major footpaths.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The pipeline route is anticipated to follow the footprint of major roads and so is considered likely to cause such impacts. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. It is anticipated that works traffic will be timed to avoid congestion impacts. There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0		

4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	The option will require new WTW, new mains and booster pumps.	0	
	4.b. Result in higher levels of reuse of waste?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No further assessment required.	0	0	The existing boreholes are located 7.3km from South West Waterbodies Ramsar site and Special Protection Area (SPA). Given the distance of the designated site and the borehole no adverse impacts are anticipated as a result of the new WTW. There should be no net change to licenced abstraction at the Hillingdon Hospital.	?	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No further assessment required.	0	0	The boreholes are located 3.8km from Fray's Farm Meadows Site of Special Scientific Interest (SSSI), 4.3km from Kingcup Meadows and Oldhouse Wood SSSI and 4.3km from Denham Lock Wood SSSI. Given the distance of the designated site and the borehole no adverse impacts are anticipated as a result of the new WTW.		
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?		No invasive species identified, however detailed ecological survey required.
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No further assessment required.	0	0		None identified.
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?		Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and landscape character assessments should be carried out where significant infrastructure works will be carried out.	-1	0	There are likely to be minor negative effects on landscape during construction phase. Mitigation measures such as screening/planting will reduce the residual effect during operational phase.	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).		

7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality. However, it is noted that the pipeline route passes within an AQMA. While the pipeline route is not known at this stage it is assumed there are likely to be negative effects on air quality during construction of the new pipeline as a result of increased traffic.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?		High	High	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	N/A	-1	0	new WTW, new mains and booster pumps. will lead to an increase in energy use and therefore carbon footprint during construction.	0
	8.b. Maximise the company's resilience to a changing climate?		N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?		N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licencing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	10.c. Alter water table levels and amount of water within aquifers?		N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Low	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	0	If there is no increase in abstraction there should be no additional impact.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?		N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No hydraulic connection with rivers	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option is not located on floodplain, and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?		N/A	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	0	0	There are no designated heritage assets that are likely to be affected by the new treatment works during construction or operation. The pipeline route has yet to be determined; therefore, it is difficult to predict the effects of this option on the historic environment. As per other options it is assumed that the pipeline will avoid designated heritage assets and that any negative effects are likely to be short-term and temporary during construction; however, this is uncertain at this stage. The pipeline will be buried during operation.	0							
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	Mitigation measures should include a full archaeological survey on site to determine the location of potential unknown archaeological assets (where further excavation work outside of current pipe lines is required.)	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.								
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		N/A	0	0	No impacts predicted	0								

1.4.1.3 AFF-TPO-WRZ6-1083

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The pipeline route is anticipated to follow the footprint of major roads. As such, this option will have minor negative construction phase effects on strategic transport infrastructure with knock on negative effects on critical services and industries. The pipeline also passes adjacent to BAP priority habitat, and consequently there are likely to be minor negative effects on this biodiversity feature during both construction and operation. Furthermore, there are likely to be minor negative effects on landscape during construction phase. This option requires additional pumping and treatment of water, and consequently it will have moderate negative construction phase, and minor negative operation phase effect on Affinity Water's carbon footprint. Further abstraction may also have a minor negative operational effect on the resilience of the local environment to climate change.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No rivers or surface water bodies are anticipated to be significantly affected by this scheme.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No significant changes to surface water flow or quality are anticipated.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The new pipeline follows the route of existing roads and through the grounds of the University of Surrey, and so no accessible informal recreation sites are anticipated to be affected during construction or operation.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The anticipated pipeline route crosses the footprint of major roads. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. Well used roads will be affected by the scheme: A3 0.1 (km), unclassified 0.5	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	The option will require New WTW at the Park Barn reservoir site and new mains.	0
	4.b. Result in higher levels of reuse of waste?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No further assessment required.	0	0	Park Barn Drive Reservoir is 3.9km from Thursley, Ash, Pirbright & Chobham Special Area of Conservation (SAC) and Special Protection Area (SPA). The Reservoir is also 2.8km from the Thames Basin Heaths SPA and 9.3km from Thursley, Hankley & Frensham Commons SPA. Given the distance of the pipeline and the closest designated site, Wey Valley Meadows SSSI, no adverse impacts are anticipated as a result of construction of the new borehole and of the new pipeline. There should be no net change to licenced abstraction at the University of Surrey borehole.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No further assessment required.	0	0	The pipeline route is 2.2km from Wey Valley Meadows Site of Special Scientific Interest (SSSI), 2.8km from Whitmoor Common SSSI, 4.8km from Ash to Brookwood Heaths SSSI and 4.9km from Colyers Hanger SSSI. Given the distance of the pipeline and the closest designated sites, the Wey Valley Meadows SSSI, no adverse impacts are anticipated as a result of construction of the new borehole and of the new pipeline. There should be no net change to licenced abstraction at the University of Surrey borehole.	?
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Low	Loss of designated sites and notable habitat should be avoided if possible. If unavoidable, compensatory habitat likely to be required. CEMP should be implemented during construction. Ecological survey required. Investigation is required into the hydrological changes to BAP Priority habitat.	-1	0	The proposed pipeline route passes through BAP Priority habitat deciduous woodland. Park Barn Drive Reservoir is adjacent to BAP Priority habitat deciduous woodland. There is the potential for loss of BAP Priority habitat deciduous woodland. Depending on depth of pipeline, potential for changes to hydrology within BAP Priority habitat deciduous woodland. Also potential for noise, light and dust disturbance during construction.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-1	0	There are likely to be short-term temporary minor negative effects on landscape during construction phase of the new pipeline. The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. The new treatment works is likely to have a minor negative effect during construction; however, mitigation measures such as screening/planting will reduce the residual effect during operational phase.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	N/A	-1	-1	Additional pumps, mains and treatment will require a minor increase in energy use for construction and operation. This will lead to an increase in carbon footprint during construction and operation.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licencing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Low	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	0	If there is no increase in abstraction there should be no additional impact.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Chalk is confined at the abstraction location so there will be no impact on nearby rivers and streams	0

12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	The option is not located on floodplain, and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0											
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	No designated heritage assets within close proximity and there are no other pathways for significant effects on the historic environment.	0											
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.												
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	No impacts predicted	0											

1.5 RNC

1.5.1.1 AFF-RNC-WRZ7-0900

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect.	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option is likely to have a minor negative construction phase effect on strategic transport infrastructure with minor knock on effects on critical services and industries. The option will also have minor negative construction phase effects on two SSSI's and five parcels of BAP priority habitat deciduous woodland. With regard to landscape features, the option will be likely to have a moderate negative effect during construction with a residual minor negative effect during operation. The option will have a minor negative effect with regard to Affinity Water's carbon footprint. Additionally further abstraction proposed by the option may have a minor negative impact during operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.97M/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The anticipated levels (minor significant impact at construction) of river water quality change are not anticipated to have material impacts on the enjoyment of water-based recreational opportunities	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			Water craft activities are not expected to be sensitive to minor changes in water quality or water flow changes. If bathing activity occurs in the affected waterbodies (considered unlikely), then minor adverse impacts on water quality may lead to impacts on the level and enjoyment of bathing activity.
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Regional	Moderate	N/A	-1	0	The anticipated pipeline route follows the footprints of roads and so is anticipated to cause such impacts. Well used roads will be affected by the scheme: Unclassified 1.2km. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0	

	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with the new pipeline	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires 1.19 km of 300 mm Diameter Main from Primrose Treatment Works to Cricketer's Public House and 1 x 1 m3 Surge Vessel	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Due to the distance to Lydden and Temple Ewell Downs SAC and Dover to Kingsdown Cliffs SAC and the fact that the River Dour hydrologically separates the Option from the SACs, no HRA is required. In addition, no HRA implications are identified as it is assumed that water will always be available as part of this option. However, if increased abstraction required to support this option under another scheme/ option is required, in combination HRA may be required.	0	0	The pipeline is 2.1km from Lydden and Temple Ewell Downs SAC, and 2.6km from Dover to Kingsdown Cliffs SAC. Due to the distance to Lydden and Temple Ewell Downs SAC and Dover to Kingsdown Cliffs SAC and the fact that the River Dour hydrologically separates the Option from the SACs, no HRA is required.	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Regional	Moderate	There is a very low potential for disturbance (through noise, light, dust etc.) to designated sites. A CEMP should be in place during construction. Depending on the depth of the pipeline there is the potential for changes in hydrology. Ecological surveys are required.	-1	0	The pipeline is 1.4km from Alkham, Lydden & Swingfield Woods SSSI, 2.1km from Lydden and Temple Ewell Downs SSSI, 2.2km from Folkestone Warren SSSI. There is a very low potential for disturbance (through noise, light, dust etc.) to designated sites. A CEMP should be in place during construction. Depending on the depth of the pipeline there is the potential for changes in hydrology. Ecological surveys are required.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	A CEMP should be in place during construction. Ecological surveys are required.	-1	0	The pipeline passes adjacent to five parcels of BAP Priority Habitat deciduous woodland. The pipeline is also within 100m of one additional parcel of deciduous woodland BAP Priority habitat, and is 114m from a parcel of lowland calcareous grassland BAP Priority habitat. There is the potential for disturbance (through noise, light, dust etc.) to BAP Priority habitats. A CEMP should be in place during construction. Depending on the depth of the pipeline there is the potential for changes in hydrology. Ecological surveys are required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include appropriate re-instatement and screening. Heritage and Landscape character assessments should be carried out where significant infrastructure works will be undertaken.	-1	0	This proposed pipeline falls within 100m of the Kent Downs AONB. Construction of the new pipeline could have a minor negative effect on the landscape in the short-term, but this will be temporary and once it is buried there will be a residual neutral effect during operation.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Given the scale of the pipeline, no significant effects are anticipated.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	This options requires new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Low	Best construction practice and CEMP in place.	0	0	Low potential for disturbance to the river habitat and associated species during construction that can be mitigated by best construction practice and insuring a CEMP is in place for the planned works	0

	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	No impacts anticipated.									
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	No impacts anticipated.									
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	No impacts anticipated.									
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	No impacts anticipated.	0								
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	No impacts anticipated.	0								
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	It is considered unlikely that this option would have any significant effects on the historic environment. There are no heritage assets within close proximity that are likely to be affected.	0								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipelines is required.	0	0	At this stage it is not considered likely that any water dependent heritage assets would be significantly affected.								
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	No impacts anticipated.	0								

1.5.1.2 AFF-RNC-WRZ7-0626

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option is likely to have a minor negative construction phase effect on strategic transport infrastructure with minor knock on effects on critical services and industries. The option will also have minor negative construction phase effects on one parcel of BAP priority habitat deciduous woodland. With regard to landscape features, this option falls entirely within the Kent Downs AONB, consequently there will be a minor negative effect during construction with a residual minor negative effect during operation. The option will have a minor negative effect with regard to Affinity Water's carbon footprint. Additionally further abstraction proposed by the option may have a minor negative impact during operation. There will also be minor negative construction phase effects on heritage assets and agricultural land.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.27M/d (peak output) equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The anticipated levels (minor significant impact at construction) of river water quality change are not anticipated to have material impacts on the enjoyment of water-based recreational opportunities	0

	2.b. Alter water levels that affect water-based recreation assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Water craft activities are not expected to be sensitive to minor changes in water quality or water flow changes. If bathing activity occurs in the affected waterbodies (considered unlikely), then minor adverse impacts on water quality may lead to impacts on the level and enjoyment of bathing activity.		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The site is not expected to be well used due to the limited access, and the availability of alternative footpaths and rivers in local area.		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Regional	Moderate	N/A	-1	0	The anticipated pipeline route follows the footprint of a major road and so is considered likely to cause such impacts. The A260 will be affected by the scheme. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with the new pipeline	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	This scheme requires a 2 x 75 kW Borehole Pumps at Broome Borehole, new UV and Marginal Chlorination treatment at Broome Borehole and 1.59 km of new 200 mm diameter transfer main from Broome Pump Station to Denton.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No HRA implications identified as it is assumed that water will always be available as part of this option. However, if increased abstraction is required to support this option under another scheme/ option, in combination HRA may be required.	0	0	The pipeline is 4.3km from Lydden & Temple Ewell Downs SAC, and 4.6km from Parkgate Down SAC. However, due to the distance to these SACs, no effects are anticipated during construction or operation.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None required	0	0	The pipeline is 3.3km from lleden and Oxenden Woods SSSI, 3.9km from Alkham, Lydden and Swingfield Woods SSSI, 4.5km from Lydden and Temple Ewell Downs SSSI and 4.6km from Parkgate Down SSSI. However, due to the distance to these SSSIs, no effects are anticipated during construction or operation.	?
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	A CEMP should be in place during construction and ecological surveys are required.	-1	0	The pipeline is adjacent to one parcel of BAP Priority habitat deciduous woodland, and is within 100m of two additional parcels of this habitat. The pipeline also passes within 200m of five additional parcels of BAP Priority habitat deciduous woodland. There is the potential for disturbance (including noise, light, dust etc.) to BAP Priority habitats during construction.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include appropriate re-instatement and screening. Heritage and Landscape character assessments should be carried out where significant infrastructure works will be undertaken.	-1	-1	This option falls entirely within the Kent Downs AONB. Construction of the new pipeline could have a minor negative effect on the landscape in the short-term, but this will be temporary and once it is buried there will be a residual neutral effect during operation. At this stage there is some uncertainty about the scale of the new building for treatment but it is assumed that it will not be significant and be located within the existing treatment site. Once mitigation has been taken into account, including planting/screening it is predicted that the significance of residual effects can be reduced. Despite the small scale of development, it is considered that there is the potential for a minor negative effect during operation, in recognition of the AONB.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Given the scale of the pipeline, no significant effects are anticipated.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	High	Construction and operation activities should follow sustainable design principles.	-1	-1	This options requires new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	

		Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate					
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?									Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts anticipated.	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts anticipated.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts anticipated.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts anticipated.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts anticipated.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts anticipated.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Heritage impact assessment should be carried out to determine the effect of the pipeline and in particular the new reservoir on designated heritage assets.	-1	0	The pipeline passes within 10m of a number of Listed Buildings and runs adjacent to a Registered Park and Garden. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase. It is assumed that there will be appropriate mitigation to ensure that the visible infrastructure does not have a significant negative effect on the historic environment.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipelines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses an area of grade 2 agricultural land. Therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

2. Groundwater options

2.1 NGW

2.1.1.1 AFF-NGW-WRZ6-0005

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters Worst case operational effect.	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The new or upgraded WTW and associated borehole are situated 67m from the nearest parcel of BAP Priority habitat and it may therefore have minor negative effects during construction phase. There are also likely to be minor negative effects on landscape during construction phase. Further abstraction may have a negative effect on the environment if not properly monitored and licenced and may therefore have a minor negative effect during operation. Abstraction during operations may a moderate negative effect on the Guildford Chalk aquifer.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.38M/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The site is not expected to be used due to the lack of access, and availability of alternative footpaths and rivers in local area.	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			No significant residual impacts on surface water quality or flows are anticipated in the scope of this option.
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			The site is not expected to be used due to the lack of access, and availability of alternative footpaths and rivers in local area.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			No impacts identified
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires a new WTW	0	

	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	None identified	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Due to the distance it is not considered that Sheepleas SSSI will be disturbed during construction.	0	0	Sheepleas Local Nature Reserve (LNR) and Site of Special Scientific Interest (SSSI) is situated 530m from the new or upgraded WTW and associated borehole. However, due to the distance it is not considered that the site will be disturbed during construction.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Ecological surveys required. A CEMP should be in place during construction.	-1	0	The new or upgraded WTW and associated borehole are situated 67m from the nearest parcel of BAP Priority habitat; deciduous woodland. Additional parcels of this Priority habitat are located 77m and 108m from the Site. The two closest of these parcels of deciduous woodland are located adjacent to the A246 and are likely already subject to disturbance. The site is also situated 107m and 199m from parcels of BAP Priority habitat traditional orchard. There is the potential for BAP Priority habitats to be subject to disturbance (noise, light, dust etc.) during the construction of a new WTW, or upgrade of the existing WTW.	?
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	It is anticipated that the new / upgraded WTW will be on the existing site, therefore this is unlikely to affect the current landscape post mitigation measures. There are likely to be minor negative effects on landscape during construction phase. Mitigation measures such as screening/planting will reduce the residual effect during operational phase	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	

7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given the scale of development. There is unlikely to be any significant impacts on local air quality during operation.	0	
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	Treatment and pumping construction and operation will require energy use (operational energy use is projected to be minimal). This will result in an increased carbon footprint during construction	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Construction and operation activities should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-2
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Hydrogeological survey and monitoring of groundwater levels in the Chalk in the Colne catchment downstream of abstraction to confirm groundwater flow and impacts.	0	-2	Abstraction during operations would be carefully monitored to understand impact on the Guildford Chalk aquifer.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	GW body already polluted by nitrates and coliforms at that location. Check headworks and upgrade if necessary.	0	0	Scheme is a borehole recommissioning. If the borehole has been constructed according to best construction practice there should be no increase in pollution risk to the aquifer.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impact expected as the Guilehill Brook Surface Water Body appears to relate to a stream on the London Clay and not receiving Chalk baseflow.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No designated heritage assets within the influence of this option.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts identified	0

2.1.1.2 AFF-NGW-WRZ1-0062

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op							Worst	
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The abstraction borehole is located 800m from Chiltern Beechwoods SAC and may therefore have minor negative operational phase effect on the SAC. Further abstraction may have a minor negative effect on the local environment during operation if not properly monitored and licenced. There may be a minor positive effect on the River Chess as the replacement abstraction is further away.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.05M/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires Pump and WTW upgrades to allow an additional 2ML/d to be abstracted.	0	
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	N/A	-1	0		The option will temporarily result in higher levels of waste production.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	Low	N/A	Long term >25 years	N/A	Permanent	Local	Low	None identified.	0	-1	CRT cow roast abstraction borehole is located 800m from Chiltern Beechwoods SAC. Possibly potential for acoustic, light and dust disturbance during construction.	-1	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	Regional	Moderate	None identified	0	?	The AMERSHAM site is located 1km from Croxley Common Moor Site of Special Scientific Interest (SSSI). Given the distance of the SSSI from the Batchworth site impacts to the SSSI are unlikely.		

	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option requires Pump and WTW upgrades to allow an additional 2ML/d to be abstracted. Given that there is pre-existing infrastructure, upgrades should not have any affect on landscape.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality. However, it is noted that the sites is 95m from the Misbourne AQMA.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	Replacement pumps and treatments will result in the use of new raw materials/products, which are not anticipated to be significant in relative terms. However this will increase Affinity Water's Carbon footprint over the short term.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Construction and operation activities should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Hydrogeological survey and monitoring of groundwater levels in the Chalk and implement trigger levels.	0	0	Scheme will alter groundwater level but should not have additional impact as it is replacing an existing abstraction which is nearby.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	No additional risk of pollution (existing borehole). Potential pollution from water runoff via headworks depending on borehole construction. Borehole integrity should be checked before operation.	0	0	Scheme is a change of licence to an existing structure. If the borehole has been constructed according to best construction practice there should be no pollution risk to the aquifer.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Replacement abstraction borehole is further away from the River Chess so there could be less impact on the River Chess. Could be impacts on River Colne.	0	1	Potential benefits on the River Chess as the replacement abstraction is further away. There could be small negative impact on River Colne.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No heritage assets are within the influence of this option.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts identified	0

2.1.1.3 AFF-NGW-WRZ2-0120

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option may have minor negative effects on public rights of way and also on strategic transport infrastructure during construction. The location of the existing & assumed new borehole is surrounded by Ruislip Woods NNR & SSSI. As such, it may have minor negative construction phase and operational effects on biodiversity. The option will increase Affinity Water's carbon footprint and will therefore result in minor negative effects in both construction and operation in this regard. This option may also reduce the resilience of the local environment to climate	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 10MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		

	1.c. Enable the growth ambitions of the study area to be realised?	change and will therefore have a minor negative effect in this regard. There may also be a moderate negative effects on water levels and quality in the Mid Chiltern Chalk aquifer during operation and the potential for minor negative operational phase effects on water bodies in the Colne catchment.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A		-1	0	The pipeline route travels along roads within existing residential areas. Furthermore, the borehole is located between Ruislip Woods National Nature Reserve and Ruislip Common and is adjacent to Ruislip Lido which are likely to be used extensively for recreation. Construction of the pipeline could result in a short-term temporary minor negative effect. Once the pipeline is buried there should be no residual effect.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A		-1	0	The pipeline follows several A roads including the A4180 and A4125. There are likely to be minor temporary negative effects during construction.
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	The roads affected by this option are not likely to result in knock on effects from congestion on critical services and infrastructure.
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A		-1	0	The option requires the refurbishment of an existing borehole, a new borehole and a new mains pipeline.
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A		-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None Identified		0	0	None identified	

biodiversity including designated and other important habitats and species?	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	High	?	Short term (< 5 years)	?	Temporary	Permanent	National	?	Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction. Detailed surveys required.	-1	-1	The location of the existing & assumed new borehole is surrounded by Ruislip Woods NNR & SSSI. The new pipeline route passes adjacent to this designated site (with the site on either side of a road) at several locations. Ruislip Woods NNR & SSSI comprises the largest block of ancient semi-natural woodland in Greater London, and also includes acid and neutral grasslands, ponds, streams and marshland. The site supports nationally rare and nationally scarce species of moths and a diverse range of breeding birds. Potential for changes in hydrology depending on depth of pipeline and location of borehole. Potential for noise, light and dust disturbance during construction.
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	Lee Valley Ramsar & SPA, and Amwell Quarry SSSI (which covers the same area) is approximately 5.4km downstream of the site. This site contains two waterbodies and wetland, grassland and woodland habitats. The site supports breeding birds and invertebrates. Potential for an effect on this site due to changes in water quality due to the borehole's proximity to the River Lee.	?	?	Lee Valley Ramsar & SPA, and Amwell Quarry SSSI (which covers the same area) is approximately 5.4km downstream of the site. This site contains two waterbodies and wetland, grassland and woodland habitats. The site supports breeding birds and invertebrates. Potential for an effect on this site due to changes in water quality due to the borehole's proximity to the River Lee.
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	?	Short term (< 5 years)	?	Temporary	Permanent	Local	Low	Avoid loss of BAP priority habitat where possible. If not possible, compensatory habitat may be required. Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction. Detailed surveys required	-1	0	The location of the existing & assumed new borehole is within an area of BAP Priority habitat deciduous woodland. Pipeline passes adjacent and through (following a road) BAP priority habitat deciduous woodland. Potential for changes in hydrology depending on depth of pipeline and location of borehole. Potential for noise, light and dust disturbance during construction. Potential for loss of BAP priority habitat
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	N/A	Mitigation measures should include appropriate re-instatement and screening.	-1	0	The pipeline route runs around the perimeter of the Ruislip Woods National Nature Reserve. Additionally, Ruislip Lido, and Ruislip Common are anticipated to be well used recreation sites. Construction may have a negative effect on the landscape setting and character. However, once re-instated the likely residual effect will be neutral	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	0
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	Construction phase activities are likely to increase Affinity Water's carbon footprint. Operation phase effects are likely to increase the footprint.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	2	This option will lead to an increase in water supply which will have a positive impact on helping address Affinity Water's resilience to projected reductions in precipitation and water supply.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	-1	Predicted climatic changes in England include hotter and drier summers. Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-2
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Hydrogeological survey and monitoring of groundwater levels in the Chalk in the Colne catchment downstream of abstraction to confirm groundwater flow and impacts.	0	-2	Abstraction during operations would be carefully monitored to understand impact on the nearby Mid Chiltern Chalk aquifer (the water body is not present at abstraction point).	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	No additional risk of pollution (existing boreholes). Potential pollution from water runoff via headworks depending on borehole construction. Borehole integrity should be	0	0	Scheme includes 3 boreholes recommissioning. If the boreholes have been constructed according to best construction practice there should be no pollution risk to the aquifer.	

											checked before operation.			
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential impact on base flow for surface water bodies in the Colne catchment depending on groundwater flow direction.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	There are a number of Listed Buildings located within 30m of the pipeline route. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should make sure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The pipeline does not cross grade 1 or 2 agricultural land.	0

2.1.1.4 AFF-NGW-WRZ5-0342

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option may have minor negative effects on public rights of way and also on strategic transport infrastructure with a knock on effect on critical services and industries during construction. There may be minor negative effects during both construction and operation on the Epping Forest SSSI and BAP priority deciduous woodland. There may also be minor negative effects on landscape during construction phase. The option will increase Affinity Water's carbon footprint and will therefore result in minor negative effects in both	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		

	1.c. Enable the growth ambitions of the study area to be realised?	construction and operation in this regard. This option may also reduce the resilience of the local environment to climate change and will therefore have a minor negative effect in this regard. There may also be a moderate negative effects on water levels and quality in the Mid Chiltern Chalk aquifer during operation. There is a scheduled monument located approximately 250m from the RYHI as such there will also be minor negative effect during construction.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	No pipeline is route is specified. The pipeline may have to cross the M11 at several locations, dependent on drilling sites. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	There may be short term effects associated with construction traffic impacts.
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires the development of a cluster of deep chalk boreholes
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	?	?	?	?	?	?	High	Given the distance of the assumed borehole locations and the SAC it is unlikely to be impacted construction and increased abstraction. CEMP should be implemented during construction. HRA may be required.	?	?	Epping Forest SAC is 3.6km from the assumed borehole locations. However the exact location of the borehole is not known and the route of the pipeline has not been identified.
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		Low	?	Medium term (5 -25 years)	?	Temporary	?	Local	Low	Depending on depth of pipelines, potential for changes to hydrology within designated sites. Also potential for noise, light and dust disturbance during construction. Potential for changes to hydrology due to draw down from borehole abstraction. Ecological survey required. CEMP should be implemented during construction.	-1	-1	Epping Forest SSSI is 300m from the assumed new borehole locations. Potential for noise, light and dust disturbance during construction. Potential for changes to hydrology due to draw down from borehole abstraction. However the exact location of the borehole is not known and the route of the pipeline has not been identified. Ecological survey required.

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	?	Medium term (5 -25 years)	?	Temporary	?	Local	Low	Undertake investigations on potential changes in hydrology. Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction. Once locations of pipeline route and borehole location are known detailed ecological survey required.	-1	-1	Potential for changes to hydrology within BAP Priority habitat deciduous woodland at Wintry Wood CWS which is 830m from the assumed new borehole locations. Also potential for noise, light and dust disturbance during construction. Potential for protected species to be affected. However the exact location of the borehole is not known and the route of the pipeline has not been identified. Ecological survey required.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	There are likely to be minor negative effects on landscape during construction phase. Mitigation measures such as screening/planting will reduce the residual effect during operational phase.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	The construction of boreholes, pumps and treatment equipment will result in the use of raw materials. This is likely to increase Affinity Water's carbon footprint. Operation phase effects are likely to increase the footprint.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	2	This option will lead to an increase in water supply which will have a positive impact on helping address Affinity Water's resilience to projected reductions in precipitation and water supply.	

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-2
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High	Hydrogeological survey and monitoring of groundwater levels in the Chalk. The Chalk aquifer becomes unconfined more than 10 km north of the abstraction point, therefore any impact would be naturally mitigated due to the distance.	0	-2	Potential for negative impact effect during construction (although very short term during construction and reversible) and operation. Abstraction during operations would be carefully monitored to understand impact on the unconfined Chalk aquifer.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High	Best construction practice.	0	0	Potential for negative impact effect during construction and operation but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impact expected as the chalk is confined by the London Clay and won't contribute to surface water bodies base flow.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	There is a scheduled monument located approximately 250m from the RYHI. There is therefore potential for negative effects during the construction phase. However, mitigation including screening/planting should reduce the significance of the residual effect during operation.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	0	0	The boreholes are located on grade 2 agricultural land. Therefore, there will be short term negative effects. Appropriate reinstatement should ensure that these effects are not experienced during construction phase.	0

2.1.1.5 AFF-NGW-WRZ5-0496

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option may have a minor negative effect on nearby BAP priority deciduous woodland during operation and may also have a minor negative effect on the resilience of the local environment to climate change during operation. There may be a moderate negative effect on the Cam Ely Ouse Chalk aquifer and minor negative effect on the flow in River Cam and Slade during operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.3M/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No road closures or works are anticipated.		
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires the development of a cluster of boreholes	0	
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	N/A	-1	0		The option will temporarily result in higher levels of waste production.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	None identified	-1	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	The Debden Road Source is 2.8km from Debden Water Site of Special Scientific Interest (SSSI) and 4.5km from Hales and Shadwey Woods SSSI. Given the distance between Debden Road Source and the closest designated site no impacts are anticipated.		

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Local	High	A CEMP should be in place during construction and ecological surveys are required. Investigations are required to determine potential impacts on base flow in the River Cam and Slade	0	-1	The closest area of BAP Priority habitat of deciduous woodland is 290m from Debden Road Source. There is potential for changes in hydrology to BAP Priority habitat deciduous woodland during operation. There is the potential for disturbance (through noise, light, dust, etc.) during construction however given the distance between the source and deciduous woodland adverse impacts are unlikely. Changes in the pattern of abstraction (i.e. increasing peak at expense of average) could possibly impact on the ecology of the River Cam and River Slade if it changed flows or water levels during sensitive periods.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No, the treatment work upgrades will be carried out within existing buildings.	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	0
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	Construction of treatment kit and new pumps and pipeline will require raw materials. This is likely to increase the carbon footprint during construction phase.	
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	2	This option will lead to an increase in water supply which will have a positive impact on helping address Affinity Water's resilience to projected reductions in precipitation and water supply.	0
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1

10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-2	
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	10.c. Alter water table levels and amount of water within aquifers?	Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High	Hydrogeological survey and monitoring of groundwater levels in the Chalk to assess impacts. Use of trigger levels.	0	-2		Potential for negative impact effect during construction of new abstraction well (although very short term during construction and reversible) and operation. Abstraction during operations would be carefully monitored to understand impact on the Cam Ely Ouse Chalk aquifer.
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High	Best construction practice.	0	0		Potential for negative impact effect during construction and operation but appropriate mitigation should ensure residual effects are neutral.
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential effect on surface water where Chalk contributes to surface water base flow in River Cam and Slade.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is no designated heritage within close proximity to the option and no other pathways for significant residual effects.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

2.1.1.6 AFF-NGW-WRZ3-0548

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option may have minor negative operation phase effect on the Lee Valley Ramsar & SPA, and Amwell Quarry SSSI, as well as BAP priority habitat deciduous woodland. The option will also have a minor negative operation phase effect with regards to Affinity Water's carbon footprint. There may be a moderate negative effect on the Chalk aquifer and minor negative effect on the surface water flows during operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.31M/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		

	1.c. Enable the growth ambitions of the study area to be realised?	N/A	High	N/A	Medium term (5-25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	2.b. Alter water levels that affect water-based recreation assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	This option requires construction of a new borehole at the Hartham WTW site, which will require borehole pumps and a 100m pipeline to connect the borehole to the existing WTW.
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	?	N/A	?	N/A	Permanent	National	High	Undertake investigations and avoid effect on SPA/Ramsar where possible. HRA potentially required.	0	-1	Lee Valley Ramsar & SPA, and Amwell Quarry SSSI (which covers the same area) is approximately 5.4km downstream of the site. This site contains two waterbodies and wetland, grassland and woodland habitats. The site supports breeding birds and invertebrates. Potential for an effect on this site due to changes in water quality due to the borehole's proximity to the River Lee.
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	?	N/A	?	N/A	Permanent	Regional	High	Undertake investigations and avoid effect on SSSI where possible.	0	-1	Amwell Quarry is approximately 5.4km downstream of the site. This site contains two waterbodies and wetland, grassland and woodland habitats. The site supports breeding birds and invertebrates. Potential for an effect on this site due to changes in water quality due to the borehole's proximity to the River Lee.
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	?	Short term (< 5 years)	?	Temporary	Permanent	Local	Low	Undertake investigations on potential changes in hydrology. Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction.	0	-1	BAP priority habitat deciduous woodland is located approximately 160m downstream of the site. Potential for changes in water quality or hydrology due to borehole's proximity to the River Lee. Potential for acoustic, light and dust disturbance during construction.

	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option requires construction of a new borehole at the Hartham WTW site, which will require borehole pumps and a 100m pipeline to connect the borehole to the existing WTW. There is the potential for some new infrastructure to be visible; however, given that it is an existing WTW site and in the context of the urban setting, this will not result in significant effects to the landscape.	0
	6.b. Provide opportunities for landscape enhancement?	Medium	Medium	Long term >25 years	Long term >25 years	Temporary	Temporary	Local	Low	N/A	1	1	There may be scope for landscape enhancement through mitigation measures such as planting.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given the scale of the proposed option. There is unlikely to be any significant impacts on local air quality.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	National	Moderate	N/A	-1	-1	There will be energy required to build the new infrastructure, and a slight increase in operational carbon footprint is expected.	
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	2	This option will lead to an increase in water supply which will have a positive impact on helping address Affinity Water's resilience to projected reductions in precipitation and water supply.	-1
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-2

	10.c. Alter water table levels and amount of water within aquifers?		Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High	Hydrogeological survey and monitoring of groundwater levels in the Chalk to assess impacts. Use of trigger levels.	0	-2	Potential for negative impact effect during construction (although very short term during construction and reversible) and operation. Abstraction during operations would be carefully monitored to understand impact on the unconfined Chalk aquifer.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?		Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High	Best construction practice.	0	0	Potential for negative impact effect during construction and operation but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?		N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential effect on surface water where Chalk contributes to surface water base flow.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No designated heritage assets within the influence of this option.	
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The pipeline does not cross grade 1 or 2 agricultural land.	0

2.1.1.7 AFF-NGW-WRZ2-0610

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	There may be minor negative construction phase effects on strategic transport infrastructure with knock on minor negative effects on critical services and industries during construction. The location of the existing & assumed new borehole is surrounded by Ruislip Woods NNR & SSSI and within an area of BAP Priority habitat deciduous woodland. Therefore there will be minor negative effects during construction and operation. There may be a moderate negative effect on the Chalk aquifer and minor negative effect on the surface water flows during operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 4MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?	There are also two Listed Buildings located within 30m of the pipeline route. There is therefore potential for negative effects during the construction phase.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		

2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	Well used roads will be affected by the scheme: A4180 2.6 (km), A404 0.1, A4125 1, Unclassified 3.8. A roads assessed due to greater length affected and greater likelihood of significant congestion impacts. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	There may be short term effects on services associated with traffic impacts	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires the refurbishment of an existing borehole, a new borehole and a new mains pipeline.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No European sites identified	0	0	No European sites identified	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	High	?	Short term (< 5 years)	?	Temporary	Permanent	National	?	Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction. Detailed surveys required.	-1	-1	The location of the existing & assumed new borehole is surrounded by Ruislip Woods NNR & SSSI. The new pipeline route passes adjacent to this designated site (with the site on either side of a road) at several locations. Ruislip Woods NNR & SSSI comprises the largest block of ancient semi-natural woodland in Greater London, and also includes acid and neutral grasslands, ponds, streams and marshland. The site supports nationally rare and nationally scarce species of moths and a diverse range of breeding birds. Potential for changes in hydrology depending on depth of pipeline and location of borehole. Potential for noise, light and dust disturbance during construction.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	?	Short term (< 5 years)	?	Temporary	Permanent	Local	Low	Avoid loss of BAP priority habitat where possible. If not possible, compensatory habitat may be required. Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction. Detailed surveys required	-1	?	The location of the existing & assumed new borehole is within an area of BAP Priority habitat deciduous woodland. Pipeline passes adjacent and through (following a road) BAP priority habitat deciduous woodland. Potential for changes in hydrology depending on depth of pipeline and location of borehole. Potential for noise, light and dust disturbance during construction. Potential for loss of BAP priority habitat. Potential for changes in hydrology to River Colne due to borehole abstraction.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	N/A	Mitigation measures should include appropriate re-instatement and screening.	-1	0	The pipeline route runs around the perimeter of the Ruislip Woods National Nature Reserve. Additionally, Ruislip Lido, and Ruislip Common are anticipated to be well used recreation sites. Construction may have a negative effect on the landscape setting and character. However, once re-instated the likely residual effect will be neutral	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term (>25 years)	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	0	0	Construction phase activities are likely to increase Affinity Water's carbon footprint. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Construction and operation activities should follow sustainable design principles.	0	1	This option will lead to an increase in water supply (4 MI/d) which will have a marginal impact on helping address Affinity Water's resilience to projected reductions in precipitation and water supply.	

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	-1	Predicted climatic changes in England include hotter and drier summers. Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-2
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Hydrogeological survey and monitoring of groundwater levels in the Chalk in the Colne catchment downstream of abstraction to confirm groundwater flow and impacts.	0	-2	Abstraction during operations would be carefully monitored to understand impact on the nearby Mid Chiltern Chalk aquifer (the abstraction is not located in the water body).	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	No additional risk of pollution (existing borehole). Potential pollution from water runoff via headworks depending on borehole construction. Borehole integrity should be checked before operation.	0	0	Scheme is a borehole recommissioning. If the borehole has been constructed according to best construction practice there should be no pollution risk to the aquifer.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential impact on base flow for surface water bodies in the Colne catchment depending on groundwater flow direction.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	There are two Listed Buildings located within 30m of the pipeline route. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should make sure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The pipeline does not cross grade 1 or 2 agricultural land.	0

2.1.1.8 AFF-NGW-WRZ4-0624

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account	Scale of impact	Sensitivity of the	Mitigation proposals	Residual effect	Effect Description	EBSD parameters
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			Probability		Duration		Permanence		receptor		Con	Opp		Worst	
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	There may be minor negative construction phase effects on strategic transport infrastructure with knock on minor negative effects on critical services and industries during construction. There are likely to be negative effects on air quality during construction of the new pipeline as a result of increased traffic due to the options location within an AQMA. Both pipeline routes pass adjacent to BAP Priority habitat deciduous woodland and may result in minor negative effects during construction. The option may have minor operation phase effects on the hydromorphology of rivers and also on the resilience of the local environment to climate change. There may be a moderate negative effect on the Chalk aquifer and minor negative effect on the surface water flows during operation. There are also two Listed Buildings located within 30m of the pipeline route. There is therefore potential for negative effects during the construction phase.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 4Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The anticipated minor residual impacts on water quality or flow in the Salt Hill Stream are not anticipated to be perceptible to informal bankside recreation users due to the small size of the water course.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0		The construction impacts on footpaths are anticipated to be significant as it is anticipated that the footpaths will be rerouted whilst the pipeline construction is underway on the canal towpath. No operation impacts are anticipated.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Well used roads will be affected by the scheme: B416 0.6 (km), Unclassified 1.2. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0		There may be short term effects on services associated with traffic impacts
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	The option requires a new pipeline along the Grand Union Canal towpath for treatment at a HWFS 2 WTW location (the existing HWFS WTW is at full capacity). A new pipeline will then take the water to existing HWFS for onward transfer to an upgraded HARR	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	0	

	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified.	0	0	The proposed pipeline from HWFS 2 to HWFS is 4.3km from South West London Waterbodies Ramsar site and Special Protection Area (SPA). The pipeline is also 4.3km from Burnham Beeches SAC and 5.1km from Windsor Forest & Great Park SAC. Given the distance of the closest designated site to the proposed pipeline route no adverse impacts are anticipated.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified.	0	0	The proposed pipeline from HWFS 2 to HWFS is 2.5km from Kingcup Meadows and Oldhouse Wood Site of Special Scientific Interest (SSSI), 3.1km from Black Park SSSI, 3.6km from Fray's Farm Meadows SSSI, 4km from Denham Lock Wood SSSI, 4.1km from Stoke Common SSSI, 4.3km from Wraysbury Reservoir SSSI, 4.3km from Burnham Beeches SSSI, 4.4km from Wraysbury No. 1 Gravel Pit SSSI and 4.5km from Staines Moor SSSI. In addition the proposed pipeline from HWFS to HARR is 4.4km from BREN Reservoir SSSI. Given the distance of the closest SSSI to the proposed pipeline route no adverse impacts are anticipated.	?
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	Low	CEMP should be implemented during construction. Ecological surveys required.	-1	0	Both pipeline routes pass adjacent to BAP Priority habitat deciduous woodland. Depending on depth of pipeline, potential for changes to hydrology to BAP Priority habitat deciduous woodland. Also potential for noise, light and dust disturbance during construction.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	The new pipeline will have minor temporary negative effects on the landscape in the short-term during construction. During operation the pipeline will be buried so it will not affect the current landscape in the long-term. There is the potential for minor negative effects as a result of the new reservoir and treatment works but this is uncertain at this stage. Mitigation measures such as screening/ planting should reduce the significance of any residual negative effects during operation so that they are minor.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality. However, it is noted that the pipeline route passes within an AQMA. There are likely to be negative effects on air quality during construction of the new pipeline as a result of increased traffic.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	N/A	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	The construction of new borehole pumping and WTW equipment will lead to an increase in carbon footprint in construction and operation.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Construction and operation activities should follow sustainable design principles.	0	1	This option will lead to an increase in water supply which will have a marginal impact on helping address Affinity Water's resilience to projected reductions in precipitation and water supply.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	-1	Predicted climatic changes in England include hotter and drier summers. Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydromorphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	10.c. Alter water table levels and amount of water within aquifers?	Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Lower Greensand. The Lower Greensand aquifer is confined and therefore any impact would be naturally mitigated due to the distance to outcrop (approx 30 km north and south).	0	-1	Potential for negative impact effect during construction (although very short term during construction and reversible) and operation. Abstraction during operations would be carefully monitored to understand impact on the confined and unconfined Lower Greensand aquifer.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Low	Best construction practice	0	0	Potential for negative impact effect during construction and operation but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Lower Greensand and Salt Hill Stream.	0	-2	Potential effect on surface water levels and flows as the GSK abstraction is / was discharged to the stream following its use. Abstraction during operations would be carefully monitored to understand impact on the confined and unconfined Lower Greensand aquifer and any flows to rivers and streams.	-2
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	There are two Listed Buildings located within 30m of the pipeline route. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should make sure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The pipeline does not cross grade 1 or 2 agricultural land.	0

2.1.1.9 AFF-NGW-WRZ5-0877

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The RYHI is adjacent to Epping Long Green East CWS, and 132m from Harlow Woods SSSI and Parndon Woods & Common LNR .The RYHI is 132m from an area of BAP Priority habitat deciduous woodland. Therefore, there may be minor negative effects during construction phase on these features. The RYHI WTW site has existing infrastructure in place. Therefore landscape is unlikely to be significantly affected by new infrastructure once mitigation is taken into account. However, there may be minor negative effects during operation. The option may have minor negative effects on the resilience of the local environment to climate change. There are also two Listed Buildings located within 30m of the pipeline route. There is therefore potential for negative effects during the construction phase.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5MI/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option involves the development of a cluster of 4 deep chalk boreholes	0	
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	N/A	-1	0		The option will temporarily result in higher levels of waste production.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None required	0	0	3.km from Epping Forest SAC. No potential for linking impact pathways.	?	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	?	Short term (< 5 years)	Long term >25 years	Temporary	?	Regional	High	A CEMP should be in place.	-1	?	The RYHI is 132m from Harlow Woods SSSI. There is the potential for any construction works to cause disturbance (noise, light, dust etc.) to these sites.		
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.		
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		Low	?	Short term (< 5 years)	Long term >25 years	Temporary	?	Local	Low	A CEMP should be in place during construction. Ecological surveys are required	-1	?	The RYHI is 132m from an area of BAP Priority habitat deciduous woodland. There is the potential for any construction works to cause disturbance (noise, light, dust etc.) There is the potential for		

	10.c. Alter water table levels and amount of water within aquifers?	Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	Hydrogeological assessment and groundwater level monitoring.	0	1	Potential for negative impact effect during construction (although very short term during construction and reversible). Assuming water quality of injected water is good then this ASR would have a positive impact on water availability in the aquifer.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High	Injected water quality monitoring. Best construction practice for the new boreholes.	0	0	Potential for negative impact effect during construction and operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impact expected as the chalk is confined by the London Clay and won't contribute to surface water bodies base flow.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	There are two Listed Buildings located within 30m of the pipeline route. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should make sure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The pipeline does not cross grade 1 or 2 agricultural land.	0

2.1.1.10 AFF-NGW-WRZ1-1050

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	There may be minor negative construction phase effects on strategic transport infrastructure with knock on minor negative effects on critical services and industries during construction. The option may have minor negative construction phase effects on areas of BAP priority deciduous woodland and also on the Ashridge Commons & Woods SSSI. There are also likely to be moderate negative effects on landscape during construction phase of the new pipeline, as small proportion of the pipeline passes through the Chilterns AONB. The option will have a minor negative effects during operation and	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		

	1.c. Enable the growth ambitions of the study area to be realised?	construction with regards to Affinity Waters carbon footprint. The pipeline passes within 15m of three listed buildings in Berkhamsted. This will result in minor negative effects on these heritage assets during construction.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. Well used roads will be affected by the scheme: A 4251 0.1 (km), A416 0.9, A41 0.1, Unclassified 3.6. A roads assessed due to significant length affected and greater likelihood of significant congestion impacts., urban other roads selected for cost as most road length affected is unclassified road.
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	There may be short term effects on services associated with traffic impacts
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires an upgrade to the Berkhamsted WTW, 4x 30kW booster pumps from Berkhamsted WTWs to Chesham High Level Reservoir and 8.41km pipeline from Berkhamsted WTWs to Chesham.
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	National	High	CEMP should be implemented during construction. HRA required.	?	0	CRT cow roast abstraction borehole is located 800m from Chiltern Beechwoods SAC. Possibly potential for acoustic, light and dust disturbance during construction.
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Regional	Moderate	Ecological survey required. CEMP should be implemented during construction.	-1	0	CRT cow roast abstraction borehole is located 800m from Asheridge Commons & Woods Site of Special Scientific Interest (SSSI). The borehole is 2.6km from Aldbury Towers SSSI and 3km from Oddy Hill & Tring Park SSSI. Depending on depth of pipeline, potential for changes to hydrology.
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Ecological survey required. CEMP should be implemented during construction.	-1	0	The new pipeline route runs adjacent to Woodland by Harriotsend Farm Pond County Wildlife Site (CWS) and Brickhill Green CWS which are also BAP Priority habitat deciduous woodland. The pipeline route is 45m from Harriotsend Spring CWS, 60m from The Rookery CWS and Hockeridge Bottom CWS which is also an area of ancient woodland. The pipeline is 250m from Dean's Wood ancient woodland. Depending on depth of pipeline, potential for changes to hydrology to CWS and ancient woodland. Also potential for noise, light and dust disturbance during construction. Potential for protected species to be affected.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-2	0	There are likely to be short-term temporary negative effects on landscape during construction phase of the new pipeline, as small proportion of the pipeline passes through the Chilterns AONB. Assuming appropriate mitigation and re-instatement the residual effect during operations should be neutral.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1	-1	There is likely to be increased carbon footprint through construction (and minimal increase for operation)	
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Construction and operation activities should follow sustainable design principles.	0	1	This option will lead to an increase in water supply which will have a marginal impact on helping address Affinity Water's resilience to projected reductions in precipitation and water supply.	-1
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Scheme is to buy water currently abstracted by Thames so there should be no additional impact.	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	N/A									
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	Scheme is to buy water currently abstracted by Thames so there should be no additional impact.									
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	Scheme is to buy water currently abstracted by Thames so there should be no additional impact.									
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Scheme is to buy water currently abstracted by Thames so there should be no additional impact.	0								
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0								
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	-1	0	The pipeline passes within 15m of three listed buildings in Berkhamsted. This will result in short term temporary negative effects on these heritage assets during construction through loss of setting and character. Assuming appropriate re-instatement, the residual effect during operation should be neutral.	0								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.								
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0								

2.1.1.11 AFF-NGW-WRZ3-1053

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	there may be a minor negative effect on landscape during construction but appropriate planting/screening should ensure that any residual effects during operation are neutral. The option will have a minor negative effects during operation and construction with regards to Affinity Waters carbon footprint and will also have a minor negative effect on the local environments resilience to climate change. There may also be a minor negative effect on the unconfined Lower Greensand aquifer during operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		

2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Drilling will occur at a pre-existing site, therefore no public rights of way or amenity assets will be affected.		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Drilling will occur at a pre-existing site, there will be no effect on the strategic transport network.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Drilling will occur at a pre-existing site, there will be no effect on the strategic transport network.		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option is for a Lower Greensand borehole to be drilled on the existing site at Kings Walden	0	
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	?	N/A		
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	?	?	?	?	?	?	?	?	?	N/A	?	
	5.e. Provide opportunities for biodiversity enhancement?	N/A	Low	N/A	N/A	N/A	Local	N/A	N/A	?	?	Potential for green roofs and native planting.		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	Low	Short term (< 5 years)	N/A	Temporary	Permanent	Local	Low	Appropriate screening/ planting.	-1	0	Potential for a minor negative effect during construction but appropriate planting/screening should ensure that any residual effects during operation are neutral.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	?	N/A	Long term >25 years	N/A	?	Local	Low		0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	Construction phase activities are likely to increase Affinity Water's carbon footprint. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase.	
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	1	The water produced from this option can be used for blending with the chalk source on site that suffers from high nitrates. This will ensure a larger volume of water resources are available, and will therefore maximise the company's resilience to climate change induced water shortages.	-1

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the LGS. The LGS aquifer becomes unconfined more than 13 km north of the abstraction point, therefore any impact would be naturally mitigated due to the distance.	0	-1	Potential for negative impact effect during construction (although very short term during construction and reversible) and operation. Abstraction during operations would be carefully monitored to understand impact on the unconfined Lower Greensand aquifer and likely to be under a short term licence.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Low	Best construction practice.	0	0	Potential for negative impact effect during construction and operation but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the LGW	0	-1	Potential effect on surface water where Lower Greensand contributes to surface water base flow north of the abstraction point.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			Drilling will occur at a pre-existing site, therefore there will be no increase to flood risk	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Appropriate screening/planting	0	0	There is a listed building located approximately 500m from the option site. However, views are limited from the site to the Listed Building and appropriate mitigation including screening/planting will ensure that residual effects are neutral.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Drilling will occur at a pre-existing site, therefore there will be no effect on agricultural land	0

2.1.1.12 AFF-NGW-WRZ3-1068

Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
		Probability		Duration		Permanence					Con	Opp		
		Con	Op	Con	Op	Con	Op							

1.a. Provide affordable access to clean water adequate to support health?	The option may have minor construction phase effect on strategic transport network. It is also located in proximity to areas of BAP priority habitat deciduous woodland and may have minor negative effects during construction. The option will have a minor negative effects during operation and construction with regards to Affinity Waters carbon footprint and will also have a minor negative effect on the local environments resilience to climate change. There may also be a minor negative effect on the unconfined Lower Greensand aquifer and potentially surface waters during operation.	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3Ml/d equates to a minor positive effect.	1	
1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
2c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Drilling will occur at a pre-existing site, therefore no public rights of way or amenity assets will be affected.	
3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	N/A	-1	0	Potential for additional construction activity traffic on Chaul End Road for CHAU upgrade to cause disruption to local traffic; however the impact is anticipated to be low.	0
3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Drilling will occur at a pre-existing site, there will be no effect on the strategic transport network.	0
4.a. Require significant new construction or demolition of existing assets?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	N/A	-1	0	New treatment equipment required.	
4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	?	
5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	Unknown at present. A detailed ecological survey of the site and data search will be required to provide further detail.	?	?	Unknown at present. A detailed ecological survey of the site and data search will be required to provide further detail. Potential for green roofs and native planting.		
5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	Low	?	?	Temporary	Permanent	Local	Low	N/A	A detailed ecological survey of the site and data search will be required to provide further detail.	-1	0	In proximity to BAP Priority Habitat deciduous woodland. Possibility of disturbance, however borehole location is within urban area and woodland is adjacent to M1.		

5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Unknown at present. A detailed ecological survey of the site and data search will be required to provide further detail.	?	?	Unknown at present. A detailed ecological survey of the site and data search will be required to provide further detail. Potential for green roofs and native planting.	
6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Re-instatement should include screening / planting.	-1	0	Potential for a minor negative effect during construction but appropriate planting/screening should ensure that any residual effects during operation are neutral.	0
6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered that local air quality impacts from construction will be negligible and will be addressed using standard construction mitigation techniques.	0
8.a. Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	Construction phase activities are likely to increase Affinity Water's carbon footprint. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase.	
8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 - 25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	2	The water produced from this option can be used for blending with the chalk source on site that suffers from high nitrates. This will ensure a larger volume of water resources are available, and will therefore maximise the company's resilience to climate change induced water shortages.	-1
9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Medium term (5 - 25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	-1	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of Affinity Water's assets to climate change. However, further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
10.c. Alter water table levels and amount of water within aquifers?	Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Lower Greensand. The Lower Greensand aquifer becomes unconfined more than 13 km north of the abstraction point, therefore any impact would be naturally mitigated due to the distance.	0	-1	Potential for negative impact effect during construction (although very short term during construction and reversible) and operation. Abstraction during operations would be carefully monitored to understand impact on the unconfined Lower Greensand aquifer and likely to be under a short term licence.	-1
10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Low	Best construction practice	0	0	Potential for negative impact effect during construction and operation but appropriate mitigation should ensure residual effects are neutral.	

11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Lower Greensand.	0	-1	Potential effect on surface water where Lower Greensand contributes to surface water base flow north of the abstraction point.	-1
12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Drilling will occur at a pre-existing site, therefore there will be no increase to flood risk	0
13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No designated heritage assets in close proximity.	0
13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Drilling will occur at a pre-existing site, therefore there will be no effect on agricultural land	0

2.1.1.13 AFF-NGW-WRZ3-1075

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option has potential for cumulative impacts to the River Lee Navigation which the Lee Valley SPA and Ramsar is dependant on and may therefore result in minor negative operational phase effects. The option will have a minor negative effects during operation and construction with regards to Affinity Waters carbon footprint and will also have a minor negative effect on the local environments resilience to climate change. There may also be a moderate negative effect on the unconfined Chalk aquifer and potentially surface waters during operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	3.b. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1	0	The option requires a new borehole with pumps and a	0

generation of waste?													surge vessel.			
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A		-1	0	The option will temporarily result in higher levels of waste production.		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	?	N/A	?	N/A	Permanent	National	High	Cumulative impacts to the base flow of the River Lee as a consequence of increased abstraction may need to be investigated. Given the distance of the abstraction point and the SPA/Ramsar it is unlikely to be impacted by increased abstraction.		0	-1	Lee Valley SPA and Ramsar located 21km from abstraction point. Increased abstraction may lead to changes to the base flow of the River Lee. Potential for cumulative impacts to the River Lee Navigation which the Lee Valley SPA and Ramsar is dependant on. Given the distance of the abstraction point and the SPA/Ramsar it unlikely that there will be impacts to the SPA/Ramsar.	?	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified		0	0	None identified		
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.		?	?		No invasive species identified, however detailed ecological survey required.
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Undertake investigations on potential changes in hydrology. Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction.		-1	0	BAP Priority habitats, lowland heath and deciduous woodland are located 20m from the abstraction point and may be subject to disturbance during construction. Potential for changes to hydrology of the habitats.		
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.		?	?		Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	The option requires a new borehole, which may require the use of drilling machinery. However, there is existing sub station infrastructure on the site so there will be no measurable impact from infrastructure as a result of this option.	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given the scale of the proposed option. There is unlikely to be any significant impacts on local air quality.	0	

8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	Construction phase activities are likely to increase Affinity Water's carbon footprint. Operation phase effects are likely to increase the footprint, although currently this is not expected to be a significant increase.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	2	The water produced from this option can be used for blending with the chalk source on site that suffers from high nitrates. This will ensure a larger volume of water resources are available, and will therefore maximise the company's resilience to climate change induced water shortages.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licensing of water abstraction.	0	-1	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of Affinity Water's assets to climate change. However, further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-2
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10. c. Alter water table levels and amount of water within aquifers?	Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High	Hydrogeological survey and monitoring of groundwater levels in the Chalk to assess impacts. Use of trigger levels.	0	-2	Potential for negative impact effect during construction (although very short term during construction and reversible) and operation. Abstraction during operations would be carefully monitored to understand impact on the unconfined Chalk aquifer.	
	10. d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	No additional risk of pollution (existing borehole). Potential pollution from water runoff via headworks depending on borehole construction. Borehole integrity should be checked before operation. Potential risk of impact on bromate plume in wider area will be assessed in hydrogeological study, and water quality monitored.	0	0	Scheme is a licence variation. If the boreholes have been constructed according to best construction practice there should be no pollution risk to the aquifer.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential effect on surface water where Chalk contribute to surface water base flow.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	No designated heritage assets within the influence of this option.	0								
	13. b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.								
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	The pipeline does not cross grade 1 or 2 agricultural land.									

2.2 EGW

2.2.1.1 AFF-EGW-WRZ2-0087

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op							Worst	
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option may have a minor negative effect during operation on the resilience of the environment to climate change if further abstraction is not properly monitored and licensed. However, there may be minor positive operational effects in terms of improving flows in teh River Lee.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 1.6MI/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	N/A	0	1		N/A
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		Access is not anticipated to change as a result of this scheme.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There are no significant congestion impacts anticipated from this scheme.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		There are no significant congestion impacts anticipated from this scheme. No other infrastructure impacts identified.
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	The option requires upgrading pumps and upgrading treatment at the existing Shakespeare Road.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		The option will temporarily result in higher levels of waste production.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	None identified	?	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	None identified		
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?		No invasive species identified, however detailed ecological survey required.

5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	BAP Priority habitat deciduous woodland is present 580m away. Due to this distance, no effect is anticipated.	0	0	BAP Priority habitat deciduous woodland is present 580m away. Due to this distance, no effect is anticipated.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option requires upgrading pumps and upgrading treatment at the existing Shakespeare Road. It is assumed that this will take place within the existing site boundaries and will therefore have no significant effects.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option involves upgrades to existing treatment and borehole infrastructure. It is assumed that any treatment upgrades will be within existing buildings.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	N/A	Construction and operation activities should follow sustainable design principles	0	0	Carbon emissions are anticipated during construction and operation. The impact is not considered significant.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	N/A	Construction and operation activities should follow sustainable design principles	0	0	Carbon emissions are anticipated during construction and operation. The impact is not considered significant.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	Medium	High	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Regional	High	Undertake assessment of potential effect of increased abstraction on groundwater and surface water. Implement groundwater level monitoring and trigger levels.	0	1	A WFD assessment may be required to demonstrate a net positive impact of this scheme; improvement of flows in the Lee, without significantly impacting the Upper Colne.	

	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Regional	High	Best construction practice.	0	0	Potential for negative impact effect during construction of borehole and operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	1	A WFD assessment may be required to demonstrate a net positive impact of this scheme; improvement of flows in the Lee, without significantly impacting the Upper Colne.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is assumed that any upgrades will be within existing buildings; therefore, no heritage assets are within the influence of this option.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option requires upgrading pumps and upgrading treatment at the existing Shakespeare Road. It is assumed that this will take place within the existing site boundaries and will therefore have no significant effects.	0

2.2.1.2 AFF-EGW-WRZ2-0090

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option may have a minor negative effect during operation on the resilience of the environment to climate change if further abstraction is not properly monitored and licensed. Additionally, further abstraction may have a minor negative operation phase effect on the the water levels in the River Very. It may also have minor negative operation effects on the Chalk Aquifer during operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.41M/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A	
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A	

2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Low	0	0	There may be changes to river quality or levels, though the abstraction increase is within licenced limits. It is anticipated that potential changes in water quality and flows will not significantly affect watercraft users.		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No changes to access are anticipated as a result of this scheme		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	N/A	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	0	0	The scheme is in a built-up area, but no significant effects are anticipated.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	0	0	The option involves upgrading three borehole pumps and the site treatment works. Boreholes and filtration equipment construction will require energy and raw materials - this is not expected to be a significant increase due to the size of the option.	0	
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low	0	0	None Identified	?	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	None Identified		
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.		
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	BAP priority habitat, deciduous woodland located 160m from Stonecross boreholes. CEMP should be implemented during construction.	0	0		Potential disturbance on nearby BAP priority habitat deciduous woodland during construction. Abstraction should remain within current licence limits and should have no additional effect on protected species or habitats. Due to the increase in peak abstraction a WFD assessment will be required for targeted GW body and hydraulically connected SW bodies. Detailed ecological surveys required or terrestrial and aquatic habitats to be affected. In-combination effects may require investigation due to increased abstraction. Abstraction will remain within the current limits of the licence and so it is assumed that environmental considerations have already been assessed for the upper limits of the licence. Consequently there should be no affects to ecological receptors if abstraction remains within the

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake assessment of potential effect of increased abstraction on groundwater and surface water. Implement groundwater level monitoring and trigger levels.	0	-1	Increase of abstraction at peak time may have some potential impact on water level in the aquifer and impact base flow in the linked surface water body (Very River). There is potential for this to have a minor negative effect on the relevant water bodies, however at this stage the significance of this effect is uncertain.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential effect on surface water where the Chalk contributes to surface water base flow in the Very surface water body.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No designated heritage assets within the influence of this option.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependent heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No grade 1 or 2 agricultural land will be affected by this option.	0

2.2.1.3 AFF-EGW-WRZ6-0173

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option may have a minor negative effect during operation on the resilience of the environment to climate change if further abstraction is not properly monitored and licensed.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.3 Ml/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified.	0	0	None identified.	?	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified.	0	0			BAP Priority habitat deciduous woodland is present 65m from the existing borehole. Surrey Hills AONB is 80m from the existing borehole. Scheme is a software upgrade, no linking impact pathways.
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?			No invasive species identified, however detailed ecological survey required.
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified.	0	0			Coylers Hanger SSSI is designated for ancient woodland and heathland habitats and is situated 2.3km from the existing borehole location. Scheme is a software upgrade, no linking impact pathways.

	5.e. Provide opportunities for biodiversity enhancement?		?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.	0
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Low	N/A	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	N/A	0	0	There is likely to be a minor non significant increase in energy use during construction and operation.	0
	8.b. Maximise the company's resilience to a changing climate?	Low	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	N/A	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the DO this option should result in positive effects on the resilience of the company to the effects of climate change	0
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0		
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0		
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake assessment of potential effect of increased abstraction on groundwater and surface water. Implement groundwater level monitoring and trigger levels.	0	0	Although the increased abstraction may have some impact on groundwater level in the Guildford Chalk groundwater body but also on base flow of the Upper part of the East Clandon Stream surface water body, the environmental impact should have already been assessed for the full licence. No further impacts are expected. No WFD required.	0
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Potential for negative impact effect during operation (already existing) but appropriate mitigation should ensure residual effects are neutral	0

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	0	Although the increased abstraction may have some impact on groundwater level in the Guildford Chalk groundwater body but also on base flow of the Upper part of the East Clandon Stream surface water body, the environmental impact should have already been assessed for the full licence. No further impacts are expected. No WFD required.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A -It is assumed that all that is required is a change in the control philosophy to allow pump speed to be varied.	0

2.2.1.4 AFF-EGW-WRZ7-0306

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBS D parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option may have a minor negative effect during operation on the resilience of the environment to climate change if further abstraction is not properly monitored and licensed. The option also involves drilling of new abstraction well which may have a minor negative effect on groundwater quality during construction. Furthermore, the option is located nearby to BAP priority deciduous woodland and may have a minor negative effect on this feature during construction.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.52 Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No significant changes to surface water flow or quality are anticipated. Therefore no recreational impacts anticipated.	0

	2.b. Alter water levels that affect water-based recreation assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No significant changes to surface water flow or quality are anticipated. Therefore no recreational impacts anticipated.		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No significant changes to surface water flow or quality are anticipated. Therefore no recreational impacts anticipated.		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	N/A	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There are no significant congestion impacts anticipated from this scheme.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There are no significant congestion impacts anticipated from this scheme. No other infrastructure impacts identified.		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Short term (< 5 years)	N/A	Temporary	N/A	N/A	N/A	N/A	Local	Low	N/A	0	0	New raw materials will be required for pumps and mains construction.	0
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	This option is within current licence limits . As a consequence no further assessment is required.	0	0	Cow Lane source is 2.8km from Dover to Kingsdown Cliffs Special Area of Conservation (SAC), 3.8km from Lydden & Temple Ewell Downs and 7.6km from Folkestone to Etchinghill Escarpment SAC. Increased abstraction for this option is within existing licensed quantities. Given the distance of the nearest SAC, 2.8km from Cow Lane to Dover to Kingsdown Cliffs, no adverse impacts are anticipated as a result of construction of the new borehole.	0
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	This option is within current licence limits . As a consequence no further assessment is required.	0	0	Cow Lane source is 1.2km from Folkestone Warren Site of Special Scientific Interest (SSSI), 2.7km from Alkham, Lydden and Swingfield Woods SSSI, 2.8km from Dover to Kingsdown Cliffs SSSI and 3.8km from Lydden and Temple Ewell Downs SSSI. Increased abstraction for this option is within existing licensed quantities. Given the distance of the nearest SAC, 2.8km from Cow Lane to Dover to Kingsdown Cliffs, no adverse impacts are anticipated as a result of construction of the new borehole.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	A CEMP should be in place during construction, and ecological surveys are required	-1	0	Potential disturbance on nearby BAP priority habitat deciduous woodland during construction. Abstraction should remain within current licence limits and should have no additional effect on protected species or habitats. Potential for disturbance to protected species within woodland habitats during construction of borehole	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No significant new visible infrastructure. No significant effects on the landscape are predicted.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No significant effects on the landscape are predicted.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option does not pass through any AQMAs.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Low	N/A	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	N/A	0	0	There is likely to be a minor non significant increase in energy use during construction and operation.	0
	8.b. Maximise the company's resilience to a changing climate?	Low	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	N/A	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the DO this option should result in positive effects on the resilience of the company to the effects of climate change	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Best construction practice during drilling.	0	0	No change in abstraction. The option involves drilling of new abstraction well which is unlikely have impacts to water levels.	

	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Regional	High	Best construction practice during drilling. Undertake regular borehole integrity check. Make sure headworks are properly sealed to surface water run off.	-1	0	No change in abstraction. The option involves drilling of new abstraction well which may have minor impacts to groundwater quality during construction. Undertake regular borehole integrity check. Make sure headworks are properly sealed to surface water run off.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No change in abstraction for this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run-off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No designated heritage assets within close proximity and no significant effects predicted on the historic environment. No known important archaeology.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts anticipated	0

2.2.1.5 AFF-EGW-WRZ7-0322

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option may have minor negative construction phase effects on the strategic transport network with knock on minor negative effects on critical services and industries. The site for the proposed new Water Treatment Works is surrounded by BAP priority habitat deciduous woodland and the existing pipeline passes through Lydden & Temple Ewell Downs SAC and SSSI. Consequently, there will be minor negative construction phase, and operational phase effects on biodiversity. The new pipeline and new WTW will result in minor negative effects on landscape during construction. Operation activities will also result in increased energy use. This is likely to have a negative impact on the carbon footprint of the company. The option will also have minor negative construction and operation effects on the resilience of the local environment to climate change. Furthermore, the option may have minor	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2 MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A	
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	N/A	0	1	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

facilities.	2.b. Alter water levels that affect water-based recreation assets?	negative operational phase effects on groundwater and surface water bodies, and minor negative construction phase effects on agricultural land.	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	0	0	The anticipated levels (minor significant impact at operation) of surface water quality change are not anticipated to have material impacts on the enjoyment of in-stream recreation	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	0	0	The construction impacts are anticipated to be insignificant as it is anticipated that the North Downs Way footpath will be rerouted whilst the pipeline construction is underway. No operation impacts are anticipated.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	Some roads will be affected by the scheme: Unclassified crossing x5 , A2 crossing.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with the new pipeline.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	The option requires 10 new boreholes and new WTW which will be constructed on an existing site.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	?	?	?	?	?	National	High	None identified based on assumptions. However, if works are required to the existing pipeline to make it suitable for operation, an HRA will be required.	?	?	Existing pipeline passes through Lydden & Temple Ewell Downs SAC and SSSI. Potential for works to affect these sites. HRA will be required to ensure no Likely Significant Effects.	-1
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		Low	Low	Medium term (5 -25 years)	Medium term (5 -25 years)	Temporary	Temporary	National	High	None identified based on assumptions. However, if works are required to the existing pipeline to make it suitable for operation, ecological investigation will be required	-1	-1	Existing pipeline passes through Lydden & Temple Ewell Downs SAC and SSSI. Potential for loss of or disturbance to this site.	
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		Low	?	Medium term (5 -25 years)	?	Temporary	?	Local	Moderate	Location of the WTW, boreholes and new pipeline between these should avoid loss of BAP priority habitat deciduous woodland. CEMP should be in place during construction.	-1	?	The site for the proposed new Water Treatment Works is surrounded by BAP priority habitat deciduous woodland. Depending on the location of the WTW there is the potential for this scheme to result in the loss of this habitat. There is also the potential for disturbance (noise, light, dust etc.) during construction. There is also the potential for changes in hydrology to affect this habitat. At the time of assessment the exact location of boreholes was	

													unknown. Once this has been identified, further ecological investigations required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-1	0	There will be short-term temporary negative effects during construction of the 500m pipeline as well as the new WTW. The new pipeline will be buried and the WTW will be developed on an existing treatment site. It is therefore considered that once mitigation is taken into account there will be a residual neutral effect during operation.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option does not pass through any AQMAs.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	This options requires significant new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	2	By upgrading the DO this option should result in positive effects on the resilience of the company to the effects of climate change	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1
	10. b. Improve water treatment and water quality before it returns to	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	surface water bodies?													
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake assessment of potential effect of increased abstraction on groundwater and surface water. Implement groundwater level monitoring and trigger levels.	0	-1	The option involves a new abstraction from an existing borehole. There is potential for this to have a minor negative effect on the levels in the Chalk groundwater body. An impact assessment might be required.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Monitor water quality regular and set pollutant concentration trigger levels.	0	-1	Coal measures aquifer is artesian and causing pollution in the Chalk aquifer. Increased abstraction could potentially increase pollution.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential effect on surface water where the Chalk contributes to surface water base flow in the Eastry surface water body.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run-off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The pump station and treatment works are not located close to any designated heritage assets. The pipeline route travels through a registered park and garden. However, as it is an existing pipeline which is to be utilised, no construction or operational effects on this asset are anticipated. No known important archaeology.	0
	13. b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	Medium	N/A	Short term (< 5 years)	N/A	N/A	Temporary	N/A	N/A	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	Some ALC Grade 2 land is crossed by the indicated pipeline route.	0

2.2.1.6 AFF-EGW-WRZ3-0502

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option will have minor negative effects on recreation assets during both construction and operation. Regarding biodiversity, it may have result in minor negative operational phase effects on the Lee Valley, SPA, Ramsar, and SSSI. The	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2 MI/d equates to a minor positive effect.	1

	1.b. Ensure that customers are not disproportionality affected by cost?	construction and operation of this option will have a minor negative effect with regards to Affinity Water's carbon footprint, and will have a minor negative effect with regard to the local environment's resilience to climate change. As the option involves an increase in abstraction it is likely to have a minor negative effect during operation on ground water and surface water bodies.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A	
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	2.b. Alter water levels that affect water-based recreation assets?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Moderate	N/A	-1	-1	A minor impact is recorded due to the popularity of the river for informal recreation and the potential for water quality and levels to be adversely affected. The operational impact assessment of informal recreation differs from in-stream recreation. Although the impact on water quality and level is considered to be the same; the receptor group is considered to be larger for informal recreation owing to the popularity of the site for informal recreation. Potential fishing sites on the Lee Navigation and at nearby lakes were identified through the Angling Trust's site (fishinginfo.co.uk). Changes to base flow of the Lee Navigation has the potential to impact on aquatic habitats and species, and it is therefore anticipated that angling at sites on the Lee Navigation might experience minor adverse impacts.	-1	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No changes to access are anticipated as a result of this scheme	
	3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There are no significant congestion impacts anticipated from this scheme.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Moderate	N/A	-1	0	The option involves expansions of an existing water treatment works including new pumps.	0	
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	?	Low	?	Medium term (5 -25 years)	Temporary	Permanent	National	High	HRA assessment likely to be required. Assessment of potential for changes in base flow at SPA/Ramsar required.	?	-1	Potential for changes to the base flow of the Lee Valley Navigation due to increased abstraction. The Lee Valley SPA (Ramsar) and SSSI is around 1.5 km southeast of the Musley Lane source and is dependent on River Lee flow. This site is also a SSSI. Potential for impacts to aquatic habitats and species.	-1
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Assessment of potential for changes in flow at SSSI required.	0	0	Potential for changes to the base flow of the Lee Valley Navigation due to increased abstraction. The Lee Valley SPA (Ramsar) and SSSI is around 1.5 km southeast of the Musley Lane source and is dependent on River Lee flow. This site is also a SSSI. Potential for impacts to aquatic habitats and species.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	?	?	?	Temporary	Permanent	National	High	None identified	?	?	No priority habitats within the vicinity of the Musley Lane source.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The new treatment works will be within an existing site and unlikely to be of a scale that would significantly affect landscape.	0
	6.b. Provide opportunities for landscape enhancement?	Medium	Low	Long term >25 years	Long term >25 years	Temporary	Temporary	Local	Low	N/A	0	0	There may be scope for landscape enhancement through mitigation measures such as planting.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	The construction and operation will require a minor increase in energy use.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the DO this option should result in positive effects on the resilience of the company to the effects of climate change	

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake assessment of potential effect of increased abstraction on groundwater and surface water. Implement groundwater level monitoring and trigger levels.	0	-1	The option involves an abstraction increase. There is potential for this to have a minor negative effect on the relevant water bodies, however at this stage the significance of this effect is uncertain.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential effect on surface water where the Chalk contributes to surface water base flow in the Lee Navigation surface water body.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No designated heritage assets within the influence of this option.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No grade 1 or 2 agricultural land will be affected by this option.	0

2.2.1.7 AFF-EGW-WRZ1-0613

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	Regarding biodiversity, the option may result in minor negative operational phase effects on the Old Rectory Meadows SSSI and, assuming appropriate mitigation and compensation, it will have minor negative construction phase effects on BAP priority habitat. The	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2 MI/d equates to a minor positive effect.	1

	1.b. Ensure that customers are not disproportionality affected by cost?	construction of this option will have a minor negative effect with regards to Affinity Water's carbon footprint, and will have a minor negative effect with regard to the local environment's resilience to climate change during operation. As the option involves an increase in abstraction it is likely to have a minor negative effect during construction on ground water and surface water bodies.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The anticipated minor residual impacts on water quality or flow are not anticipated to be perceptible to informal bankside recreation users. The anticipated levels of river water quality change are not anticipated to have material impacts on the enjoyment of in-stream recreation.
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Construction work is not anticipated to occur outside the anticipated site boundaries (which contains no roads).
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Moderate	N/A	-1	0	New raw materials would be required to construct the borehole and booster pumps.
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	New raw materials would be required to construct the borehole and booster pumps.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None required	0	0	Burnham Beeches SAC is located 5.9km from the pumping station and proposed borehole location. However, due to this distance no effects are anticipated.
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	There is the possible potential for changes in hydrology during operation. Ecological survey is required. And investigations into hydrological interactions are required.	?	-1	Old Rectory Meadows SSSI is located 1.8km downstream of the borehole location. There is the potential for changes in hydrology at this site during operation. Although there is uncertainty of this.
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	?	Short term (< 5 years)	?	Temporary	?	Local	Low	A CEMP should be in place during construction and ecological surveys are required. Investigations are required to determine potential impacts on base flow in the River Misbourne	-1	?	The pumping station and borehole location is 11m and 40m from parcels of BAP Priority habitat deciduous woodland. There is the potential for disturbance (through noise, light, dust etc.) during construction, and changes in hydrology during construction and operation. Changes in the pattern of abstraction (i.e. increasing peak at expense of average) could possibly impact on the ecology of the River Misbourne if it changed flows or water levels during sensitive periods, given the river is located 10 m from the pumping station and borehole location. However it is unknown whether these BAP Priority habitat parcels interact with the aquifer and river. A CEMP should be in place and ecological surveys are required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new visible infrastructure required.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new visible infrastructure required.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is not likely to be any significant effects on air quality.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	N/A	Long term >25 years	N/A	Permanent	N/A	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	0	There is expected to be a slight negative impact in construction emissions, with no operational emissions anticipated (there will be no net change in the average annual output therefore it is assumed electricity and chemical dosing requirements will be similar to present)	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the DO this option should result in positive effects on the resilience of the company to the effects of climate change	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction (at peak) may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	High	N/A	Long term >25 years	N/A	Temporary	N/A	Regional	Moderate	Undertake assessment of potential effect of increased abstraction on groundwater and surface water. Implement groundwater level monitoring and trigger levels.	-1	0	The option involves an abstraction increase at Gerrards Cross. There is potential for this to have a minor negative effect on the relevant water bodies and potentially dependent SSSI, however at this stage the significance of this effect is uncertain.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake regular borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Existing potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	High	N/A	Long term >25 years	N/A	Temporary	N/A	Local	High	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	-1	0	Changes in the pattern of abstraction (i.e. increasing peak at expense of average) could possibly impact on the ecology of the River Misbourne if it changed flows or water levels during sensitive periods, given the river is located 10 m from the pumping station and borehole location. Investigations are thus required to determine potential impacts on base flow in the River Misbourne.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is no designated heritage within close proximity to the option and no other pathways for significant residual effects.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No known important archaeology.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts anticipated	0

2.2.1.8 AFF-EGW-WRZ2-0622

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	Regarding biodiversity, the option may result in minor negative construction and operational phase effects on BAP priority habitat. There are also likely to be minor negative effects on landscape during construction phase. The construction of this	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 28 MI/d equates to a minor positive effect.	1

	1.b. Ensure that customers are not disproportionality affected by cost?	option will have a minor negative effect with regards to Affinity Water's carbon footprint, and will have a minor negative effect with regard to the local environment's resilience to climate change during operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A	
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No pipelines or construction outside existing site are anticipated.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Moderate	N/A	-1	0	The option requires a new surface water related pre-treatment WTW at HILF and upgrading of existing LANE WTW and also 300m of 600mm mains pipeline at HILF.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	None identified	-1
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	None identified	
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		?	Medium	?	Long term >25 years	?	Permanent	Local	Moderate	Avoid loss of BAP habitat if possible. If not possible, compensatory habitat may be required. CEMP should be in place during construction. Assessment of affect of water quality/level changes on HILF required.	-1	-1	Areas of BAP priority habitat deciduous woodland are present adjacent to HILF. Potential for these to be lost or disturbed. HILF and surrounding habitat is designated as a Local Nature Reserve (LNR) and a County Wildlife Site (CWS). HILF comprises a reservoir with marshy areas, and supports bird and invertebrate species. The site will be disturbed and land lost during the construction of the new treatment works and pipeline. HILF may be affected by water quality changes when storing water, and changes in hydrology depending on the depth of the pipeline. Location of new WTW and pipeline within the site is	

													currently unknown.	
	5.e. Provide opportunities for biodiversity enhancement?									Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Mitigation measures should include appropriate re-instatement and screening.	-1	0	There are likely to be minor negative effects on landscape during construction phase. However, as there is significant existing infrastructure at the location in the form of pumping stations and also the M1 located near by, mitigation measures such as screening/planting should reduce the residual effect during operation to neutral.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor impacts on air quality during construction of the replacement WTW; however, this will not be of significance.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	The scheme requires construction of new pumps, power control units and pipework, this will require raw materials. The construction and operation will increase energy use.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the DO this option should result in positive effects on the resilience of the company to the effects of climate change	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction (at peak) may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No change in abstraction in this scheme.	0
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake regular borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Existing potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No change in abstraction in this scheme.	0

levels and flows?															
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0									
13. Conserve and enhance the historic environment, heritage assets and their settings?	13.a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	No designated heritage assets within the influence of this option.	0									
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.										
14. Minimise loss of soil quality and sterilisation of mineral resources?	14.a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	No agricultural land will be affected by this option.	0									

2.2.1.9 AFF-EGW-WRZ7-0629

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option involves a negotiation to increase the abstraction license. Therefore this will result in higher levels of abstraction and may consequently result in minor negative effects on the resilience of the local environment to climate change, ground water levels and surface water levels.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.14 Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing	

												infrastructure.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	None identified	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	?	?	?	?	?	?	?	?	?	?	Potential for effect on nearby SSSI from increased groundwater abstraction	
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	?	?	None identified - survey required if any ground works	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	?	?	?	?	?	?	?	?	?	Potential for effect on nearby BAP priority habitat deciduous woodland from increased groundwater abstraction	
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	?	?	None identified - scheme is applying for a licence for increased abstraction, no works required	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	None – This is a license change with the use of existing infrastructure.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the DO this option should result in positive effects on the resilience of the company to the effects of climate change	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	?	0	-1	Further abstraction (at peak) may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	0	-1	The option involves a negotiation to increase the abstraction licence (based on water discharged to ground not currently being accounted for in the water balance). This will therefore result in a slightly higher level of abstraction. There is potential for this to have a minor negative effect on the relevant water bodies, however at this stage the significance of this effect is uncertain given the returned volume.	

	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential effect on surface water where the Chalk contributes to surface water base flow in the Upper Dour surface water body.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This is a license change with the use of existing infrastructure.	0

2.2.1.10 AFF-EGW-WRZ5-0882

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	Construction activities may create minor negative effects on strategic transport infrastructure and have knock on effects on critical services and industries. This option may also result in a minor negative effect on recreation assets during operation. Regarding biodiversity features, the pipeline route crosses through four parcels of BAP priority habitat deciduous woodland, assuming appropriate mitigation and compensation, this will result in a minor negative effect during construction. There will also likely to be a minor negative effect on landscape during construction. The construction and operation of this option will have a minor negative effect with regards to Affinity Water's carbon footprint, and will have a minor negative effect with regard to the local environment's resilience to climate change. As the option involves an increase in abstraction it is likely to have a minor negative effect during operation on ground water and surface water bodies. There will also be minor negative effects on heritage assets and agricultural land.	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2 MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1
	2.b. Alter water levels that affect water-based recreation assets?		N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	Local	Moderate	N/A	0	-1	Yes, the River Cam - Audley End site might be affected by the reduction in River Cam base flow. A minor negative impact is anticipated on this brown trout fishery. This is due to the anticipated water flow/quality impact and the	

													anticipated level of use given its proximity to Saffron Walden.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Medium	N/A	Temporary	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	Well used roads will be affected by the scheme: B1039 0.7 (km), B1383 0.1, M11 0.1, Unclassified 0.2.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Temporary	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with the new pipeline.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Medium	N/A	Permanent	N/A	National	N/A	Local	Moderate	N/A	-1	0	Upgrading of the Wendon Source Works will require raw materials.	0
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	None identified	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	None identified	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	?	Long term >25 years	?	Permanent	?	Local	Low	Changes in the pipeline route could avoid the effects on BAP Priority habitats. The loss of BAP Priority habitat should be avoided where possible. If this is not possible, compensatory habitat will be required. There is the potential for disturbance to BAP Priority habitats during construction (light, noise, dust etc.), a CEMP should be in place and ecological surveys are required.	-1	?	The pipeline passes through four parcels of BAP Priority habitat deciduous woodland near to UTTL, including one parcel that is traversed by 160m. The pipeline route also passes adjacent to three additional parcels of deciduous woodland Priority habitat. The pipeline also passes 19m and 57m from two parcels of BAP Priority habitat traditional orchard. There is the potential for disturbance to BAP Priority habitats during construction (light, noise, dust etc.) Pipeline runs alongside and crosses Wendon Brook in two locations. The potential new borehole may be less than 20m from the watercourse. Although existing investigations state there would be minimal impacts on Wendon Brook, there is the potential for changes to water quality and disturbance of the watercourse during construction, as well as the operation of any new boreholes. This has the potential to affect river habitats and associated species.	

	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There are likely to be short-term temporary minor negative effects on landscape during construction phase of the new pipeline. The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. The new building for the WTW upgrade may have also have a minor negative effect during construction; however, once mitigation is taking into account it is predicted that the residual effect during operation will be neutral.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given the scale of the proposed option. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Medium	Short term (< 5 years)	Medium term (5 - 25 years)	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	Construction and operation of the upgraded Wendon Source Works will result in an increase in energy use.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the DO this option should result in positive effects on the resilience of the company to the effects of climate change	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake assessment of potential effect of increased abstraction on groundwater and surface water. Implement groundwater level monitoring and trigger levels.	0	-1	The option involves an abstraction increase. There is potential for this to have a minor negative effect on the relevant water bodies, however at this stage the significance of this effect is uncertain.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential effect on surface water where the Chalk contributes to surface water base flow in the Cam and Wendon Brook surface water bodies.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Medium	Low	Short term (< 5 years)	Medium term (5 - 25 years)	Temporary	Temporary	Regional	Moderate	Heritage impact assessment should be carried out to determine the effect of the upgrades on designated heritage assets.	-1	0	There is one Listed Building located 40m from the UTTL which requires upgrading. There is therefore potential for negative effects during the construction phase. However, suitable mitigation such as screening/planting should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase. No known important archaeology.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	Low	Short term (< 5 years)	Medium term (5 - 25 years)	Temporary	Temporary	Regional	Moderate	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	Some ALC Grade 2 land is crossed by the indicated pipeline route.	0

2.2.1.11 AFF-EGW-WRZ7-0908

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This options involves the re-commission of the currently disused borehole at Tappington Source to provide resilience for the licence group. Abstraction should remain within current licence limits and should have no additional effects on the majority of receptors. However, it is located entirely within the Kent Downs AONB therefore if any construction activities are required there may be minor negative effects on landscape.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.7 Ml/d equates to a minor positive effect (resilience increased despite no net abstraction increase).	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No significant changes to surface water flow or quality are anticipated. Site assumed inaccessible to the public (no public rights of way or public facilities in site footprint)	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Construction work is anticipated to occur within existing site boundaries.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	N/A	Short term (< 5 years)	N/A	Permanent	N/A	Local	Moderate	N/A	0	0	Construction of new pumps will require use of raw materials. This is unlikely to be significant volumes.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	This option is within existing license group quantities. As a consequence no further assessment is required.	0	0	Tappington South groundwater source is located 3.9km from Parkgate Down Special Area of Conservation (SAC), 5.1km from Lydden & Temple Ewell Downs SAC and 6.9km from Folkestone to Etchinghill Escarpment SAC. Abstraction should remain within current licence limits and should have no additional effect on European sites.	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	This option is within existing license group quantities. As a consequence no further assessment is required.	0	0		

														designated sites.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.		
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	This option is within existing license group quantities. As a consequence no further assessment is required.	0	0	Tappington South groundwater source is 122m from BAP Priority habitat lowland calcareous grassland and 166m from BAP Priority habitat deciduous woodland. Abstraction should remain within current licence limits and should have no additional effect on protected species or habitats.		
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-1	0	This option will be contained within a previously developed site and utilise existing infrastructure, however it is located entirely within the Kent Downs AONB therefore there may be minor negative effect on landscape during construction. Mitigation measures such as screening/planting will reduce the residual effect during operational phase.	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the site is not located in any AQMAs. There is unlikely to be any significant impacts on local air quality during operation.	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	High	Short term (< 5 years)	Medium term (5 -25 years)	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	0	0	There will be a marginal insignificant increase in energy use.	0	

	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the supply resilience this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	N/A	Moderate	Construction and operation activities should follow sustainable design principles.	0	0	N/A	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Undertake assessment of potential effect of increased abstraction on groundwater and surface water. Implement groundwater level monitoring and trigger levels.	0	0	No change in abstraction in this scheme. Tappington South is currently disused so there may be local changes on water table levels once abstraction restarts.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake regular borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Existing potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No change in abstraction in this scheme.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run-off.	
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No designated heritage assets within the influence of this option. No known important archaeology.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts anticipated- No pipework and existing borehole will be used.	0

2.2.1.12 AFF-EGW-WRZ5-1057

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option may have a minor negative effect on a range of SSSIs, CWSs and SPAs during both construction and operation. There may also be minor negative effects on nearby BAP priority habitat deciduous woodland during construction. As the option involves further abstraction there may be minor negative operation phase effects on the resilience of the local environment to climate change and also ground water bodies.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2 Ml/d equates to a minor positive effect (resilience increased despite no net abstraction increase).	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A	
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	N/A	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The anticipated minor residual impacts on water quality or flow are not anticipated to be perceptible to the majority of informal bankside recreation users. Site assumed inaccessible to the public (no public rights of way or public facilities in site footprint)	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This option is a licence amendment and WTW upgrade. It is anticipated that upgrades to WTW will be carried out within existing buildings / site footprint.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This option is a licence amendment and WTW upgrade. It is anticipated that upgrades to WTW will be carried out within existing buildings / site footprint.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This option is a licence amendment and WTW upgrade. It is anticipated that upgrades to WTW will be carried out within existing buildings / site footprint.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This option is a licence amendment and WTW upgrade. It is anticipated that upgrades to WTW will be carried out within existing buildings / site footprint, and will not involve	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	?	N/A	?	N/A	?	National	High	HRA may be required	0	?	There is the potential for increased abstraction at this location to affect the hydrology of the Lee Valley SPA and associated SSSI.	-1

<p>5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?</p>	<p>Low</p>	<p>?</p>	<p>Medium term (5-25 years)</p>	<p>?</p>	<p>Temporary</p>	<p>?</p>	<p>Regional</p>	<p>Moderate</p>	<p>Ecological survey will be required and a CEMP should be in place during upgrade works.</p>	<p>-1</p>	<p>-1</p>	<p>Hunsdon Mead SSSI and CWS is approximately 400 m up gradient of the Roydon source and is a water dependent ecosystem; however Affinity Water's conceptual model for this area suggests that the Chalk (from which the abstraction takes place) and the gravels (which support the SSSI) are hydraulically separated, implying minimal impact of abstraction. The Lee Valley SPA and SSSI is approximately 2 km downgradient of the source. County Wildlife Sites are present; the Roydon source is 275m from Plantation by Rye Lock CWS, 285m from Plantation by Roydon Lock CWS, 480m from an unnamed CWS, 850m from Grassland S. of Stanstead Bury Farm CWS, 1.1km from Rye Meads Gravel Pit CWS and 1.4km from Roydon Lake CWS. Potential for these sites to be disturbed during the upgrade of the WTW, and potential for hydrological changes at these sites due to increased abstraction. A CEMP should be in place during construction and ecological surveys are required.</p>	
<p>5.c. Impact on non-native species?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>No invasive species identified, however detailed ecological survey required.</p>	<p>?</p>	<p>?</p>	<p>No invasive species identified, however detailed ecological survey required.</p>	
<p>5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?</p>	<p>Low</p>	<p>?</p>	<p>Medium term (5-25 years)</p>	<p>?</p>	<p>Temporary</p>	<p>?</p>	<p>Local</p>	<p>Low</p>	<p>A CEMP should be in place during construction, and ecological surveys are required.</p>	<p>-1</p>	<p>?</p>	<p>BAP Priority habitat deciduous woodland is present 264m, 286m and 467m from the Roydon source. BAP Priority habitat coastal and floodplain grazing marsh is present 250m from the Roydon source. BAP Priority habitat lowland meadows is present at Hunsdon Mead SSSI, 400m from the Roydon source. The River Stort is located 270m from the Roydon source, and the Roydon source is also adjacent to two ponds and a water-filled ditch or drain. Potential for changes in hydrology at these habitats, and potential for disturbance during the upgrade of the WTW.</p>	
<p>5.e. Provide opportunities for biodiversity enhancement?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.</p>	<p>?</p>	<p>?</p>	<p>Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.</p>	

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This option is a licence amendment and WTW upgrade. It is anticipated that upgrades to WTW will be carried out within existing buildings / site footprint.		
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This option is a licence amendment and WTW upgrade. It is anticipated that upgrades to WTW will be carried out within existing buildings / site footprint.		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	High	Short term (< 5 years)	Medium term (5 -25 years)	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	0	There will be a marginal increase in energy use	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading supply resilience this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake assessment of potential effect of increased abstraction on groundwater. Implement groundwater level monitoring and trigger levels.	0	-1	The option involves an abstraction increase. There is potential for this to have a minor negative effect on the relevant water bodies, however at this stage the significance of this effect is uncertain. Increased abstraction will lead to reduce heads in the chalk aquifer which could impact other users. Unlikely to affect surface water as the chalk is confined at the abstraction point.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts expected on surface water as the groundwater body is confined.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A - This option is a licence amendment and WTW upgrade. It is anticipated that upgrades to WTW will be carried out within existing	0

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option will provide minor positive effects against all objective 1 sub objectives through providing continuity of supply. However, there are likely to be minor negative effects on landscape both during construction and operation due to the presence of an expanded reservoir and new treatment works. Further abstraction via this option may also have a minor negative effect on the resilience of the local environment to the effects of climate change. However, injection of winter excess water into the confined chalk or Lower Greensand aquifer should result in moderate positive effects during operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. The peak scheme yield is assumed to be 5 MI/d, but this would require recharging with 2 MI/d into the deep aquifer during wetter 6 months of the year (based on a more well-developed scheme for ASR in the Essex Confined aquifer). This equates to a minor positive effect	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No significant river or surface water impacts identified as part of this scheme during construction or operation.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The anticipated pipeline route follows the footprint of major roads and so is considered likely to cause such impacts. Well used roads will be affected by the scheme: A30 1.5 (km), A308 0.3, A328 0.1, Unclassified 1.3. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. It is anticipated that works traffic will be timed to avoid congestion impacts.	0

	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires new treatment works and associated infrastructure.	0
	4.b. Result in higher levels of reuse of waste?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Regional	Moderate	A CEMP should be implemented during construction of the boreholes and pipeline. Further assessment may be required when borehole locations have been determined. Loss of designated sites and notable habitat should be avoided if possible. If unavoidable, compensatory habitat likely to be required.	-1	0	The proposed pipeline route is 1.3 km from South West London Waterbodies Ramsar site and Special Protection Area (SPA) and is 520 m from Windsor Forest & Great Park Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI). The EGHS WTW is 1.6 km from South West London Waterbodies Ramsar and SPA. There is potential for acoustic, light and dust disturbance during construction of the pipeline in designated sites within 200 m and possibly up to 500 m. Potential for changes in hydrology of the site depending on depth and construction method of pipeline relative to the surrounding hydro-geology	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Regional	Moderate	A CEMP should be implemented during construction of the boreholes and pipeline. Further assessment may be required when borehole locations have been determined. Loss of designated sites and notable habitat should be avoided if possible. If unavoidable, compensatory habitat likely to be required.	-1	0	The proposed pipeline route is 520 m from Windsor Forest & Great Park Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI). The pipeline route is adjacent to Langham Pond SSSI, and 900 m from Wraysbury & Hythe End Gravel Pits SSSI. The treatment works is 1.7 km from Wraysbury Reservoir SSSI and 1.1 km from Staines Moor SSSI. There is potential for acoustic, light and dust disturbance during construction of the pipeline in designated sites within 200 m and possibly up to 500 m. Potential for changes in hydrology of the site depending on depth and construction method of pipeline relative to the surrounding hydro-geology	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Regional	Moderate	A CEMP should be implemented during construction of the boreholes and pipeline. Further assessment may be required when borehole locations have been determined. Loss of designated sites and notable habitat should be avoided if possible. If unavoidable, compensatory habitat likely to be required.	0	0	The propose pipeline route passes through BAP Priority habitat deciduous woodland and is located adjacent to BAP Priority habitat reedbeds. The new borehole field vicinity has the potential to be within BAP Priority habitat deciduous woodland. There is the potential for habitat loss. Potential for acoustic, light and dust disturbance during construction. Potential for changes in hydrology of the site depending on depth of pipeline.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	N/A	-1	-1	There are likely to be minor negative effects on landscape during construction phase. Pipeline will be buried so will not have any negative effects during operation. The new treatment works and expanded reservoir have the potential for a negative effect during operation. Mitigation measures such as screening/planting should help to reduce the residual negative effects during the operational phase. However, this is uncertain.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality. However, it is noted that a very small proportion of the scheme is within an AQMA.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	National	Moderate	N/A	-1	0	Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. There is likely to be a slight increase in operational energy use and an increase in energy use during construction.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new structures in surface water body	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		0
	10.c. Alter water table levels and amount of water within aquifers?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Regional	High	Positive effect so no mitigation effect although monitoring borehole will be in place to monitor chalk groundwater levels. Temporary dewatering while testing new boreholes.	0	2	Injection of winter excess water into the confined chalk or Lower Greensand (LGS) for use in the summer peak demand period.	2
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Medium	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	High	Best construction practice and CEMP in place. Ensure headworks are sealed and sanitary seal is in place. Treatment of injection water to potable standards. Regular quality testing of injection water.	0	0	Possible contamination of GW body during construction but risk should be negligible with mitigation in place.	0
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impact as abstraction will remain within licence and injection GW body is confined.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option is partially located within a flood zone area, however it will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

3. Surfacewater options

3.1 ESW

3.1.1.1 AFF-ESW-WRZ6-0801

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op							Worst	
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option may have minor negative construction phase effects on the South West London Waterbodies SPA/Ramsar, SSSI and nearby BAP priority habitat. The construction and operation of this option will also result in a minor negative effect on Affinity Water's carbon footprint. This option involves abstraction which may also have a negative effect on the resilience of the local environment to climate change if not properly monitored and licensed. This increased abstraction may also negatively effect groundwater and surface waters.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 1M/d (peak output) equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Low	N/A	-1	0	The option requires upgrading/expansion of existing WTW and an extension to St Anns Hill service reservoir to incorporate 10 M/d.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	Medium	N/A	Short term (< 5 years)	N/A	Permanent	N/A	National	High	HRA assessment likely to be required. Assessment of potential for changes in hydrology at SPA/Ramsar required.	-1	0	St. Ann's Lake, part of the South West London Waterbodies SPA/Ramsar is 0.3km from St. Ann's Hill Reservoir. This site is also a SSSI. Potential for changes in hydrology due to expansion of St. Ann's Hill reservoir.	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Medium	N/A	Short term (< 5 years)	N/A	Permanent	N/A	National	High	HRA assessment likely to be required. Assessment of potential for changes in hydrology at SPA/Ramsar required.	-1	0	St. Ann's Lake, part of the South West London Waterbodies SPA/Ramsar is 0.3km from St. Ann's Hill Reservoir. This site is also a SSSI. Potential for changes in hydrology due to expansion of St. Ann's Hill reservoir.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	?	Short term (< 5 years)	?	Permanent	N/A	Local	Low	Avoid loss of BAP priority habitat if possible. If not possible, compensatory habitat may be required. CEMP should be in place during construction	-1	0	St. Ann's Hill Reservoir (to be expanded) is surrounded by BAP priority habitat deciduous woodland. Extent of expansion is not yet known.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The upgrade/ extension of the WTW could have some impacts on the landscape during construction, but these are predicted to be minimal given that it is an existing WTW site. It is predicted that there will be a residual neutral effect during construction and operation once mitigation is taken into account.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There may be scope for landscape enhancement through mitigation measures such as planting.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality. It should also be noted that the site is in close proximity to the M3.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-1	-1	This options requires new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1

	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	1	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	?	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Groundwater level monitoring. Implementation of trigger levels.	0	-1	Increased abstraction from surface water could impact groundwater level in the aquifer. Change in abstraction from groundwater could also impact levels.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Permanent	Regional	High	Undertake borehole integrity check. Make sure headworks are properly sealed to surface water run off.	0	0	Potential for negative impact effect during operation but appropriate mitigation should ensure residual effects are neutral	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Downstream monitoring of flow.	0	-1		-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No designated heritage assets within the influence of this option.	0

environment, heritage assets and their settings?	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.									
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		N/A	0	0	No grade 1 or 2 agricultural land will be affected by this option.	0									

3.2 RES

3.2.1.1 AFF-RES-WRZ5-0809

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option may have a minor positive effect on recreation during operation. However, it will have minor negative construction phase effects on strategic transport infrastructure with knock on minor negative effects on critical services and industries. The RYHI location is within 100m of Harlow Woods SSSI, and the pipeline passes adjacent to coastal and floodplain grazing marsh. While abstraction occurs the from River Roding at an area of BAP priority habitat coastal and floodplain grazing marsh. As such, there will be minor negative effects during construction and operation. There are likely to be moderate negative effects on landscape during construction as a result of the new buildings and fully bunded dam embankment, while there will be minor negative effects during operation. The option will be likely to have a minor negative effect with regards to Affinity Waters carbon footprint and also with regard to the resilience of the local environment to climate change. The option may alter the hydro geomorphology of river channels and consequently result in minor negative effects with regards to the naturalisation of water channels. Furthermore, abstraction from the River Roding and new reservoir may have moderate negative effects on WFD status and downstream users. The option is likely to have minor negative effects during construction and operation with regards to heritage assets while it will have major negative effects on agricultural land during construction phase.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 6MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The option may alter the hydro geomorphology of river channels and consequently result in minor negative effects with regards to the naturalisation of water channels. Furthermore, abstraction from the River Roding and new reservoir may have moderate negative effects on WFD status and downstream users. The option is likely to have minor negative effects during construction and operation with regards to heritage assets while it will have major negative effects on agricultural land during construction phase.	N/A	High	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	N/A	0	1	The anticipated levels (minor significant impact at operation and construction) of river water quality change are not anticipated to have material impacts on the enjoyment of in-stream recreation during construction. However, the new Birds Green reservoir is anticipated to be accessible to the public and will therefore result in a positive effect.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	Several minor roads will be affected by the scheme: B-roads/unclassified 21.8 (km), A414 (pipe also crosses road) 2. B roads assessed due to greater length affected and resulting greater likelihood of significant congestion impacts. There may therefore be a temporary negative effect associated with construction of this pipeline.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	This option requires a river intake and pumping station at Marden Ash (River Roding), a new fully bunded bankside storage reservoir located at Birds Green, an onsite Water Treatment works and pumping station. Additionally, it will require 32.2km of mains pipeline to RYHI.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	None identified	-1
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	High	Implement CEMP during construction to avoid disturbance to SSSI.	-1	0	RYHI location is within 100m of Harlow Woods SSSI, comprising three adjacent ancient semi-natural woods. Potential acoustic, light and dust disturbance to SSSI.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	?	Medium term (5 -25 years)	?	Temporary	Permanent	Local	Moderate	Prevent hedgerow severance where possible. Assess potential for degradation of floodplain grazing marsh. Avoid loss of deciduous woodland. Implement CEMP during construction to avoid disturbance. If possible, relocation of abstraction point downstream of BAP habitat.	-1	-1	Pipeline passes through deciduous woodland and crosses field margins - potential for severance of hedgerows. Birds Green Reservoir location may affect adjacent streams. Pipeline passes adjacent to coastal and floodplain grazing marsh. Abstraction from River Roding at an area of BAP priority habitat coastal and floodplain grazing marsh. Potential for difference in water quality or flow which may affect this habitat.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

		High	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Mitigation measures should include appropriate landscaping and re-instatement post construction of pipeline and reservoir.	-2	-1		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?												There are likely to be negative effects on landscape as a result of the new buildings and fully bunded dam embankment during the construction and operation phases. Mitigation measures such as screening/planting will reduce the residual effect during operational phase. However, the reservoir and dam embankment will result in a residual long-term negative effect during operation as they will remain prominent in the landscape post mitigation. The new raw water pipeline will also have negative effects during construction; however, following the reinstatement of the land it is predicted that there will be a residual neutral effect during operation.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts identified.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-2	-1	This options requires significant new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	This option could have negative affects on SSSIs and crosses several river channels.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydromorphology could potentially be impacted.	
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impact on groundwater	-1
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impact on groundwater	

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Monitoring scheme and trigger levels downstream of abstraction	0	-2	Abstraction from the River Roding and new reservoir might have some impact on WFD status or downstream users.	-2
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction. Heritage assets in close proximity too the pipeline may experience short term negative effects during construction, while those close to the reservoir may experience permanent loss of setting and character.	-1	-1	The construction of the new raw water pipeline is in close proximity to and is likely to be visible from a number of Listed Buildings and a Scheduled Monument. However, appropriate reinstatement of any land affected following construction is anticipated to result in negative effects being short-term, temporary and it is therefore predicted that the operational phase for the new raw water pipeline will have a residual neutral effect. The site of the new reservoir is visible from a number of Listed Buildings; therefore, there is the potential for negative effects during construction and operation. There is a significant level of uncertainty at this stage as the precise location of the reservoir and height of the bunded dam embankment are not known.	-1
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipelines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Regional	High	Mitigation measures should include full re-instatement of any land or soil affected by pipeline construction.	-3	0	The pipeline route crosses a large area of grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary. The reservoir is also located on grade 2 agricultural land, the construction of which will result in the permanent loss of this land. it will therefore have significantly negative effects both during construction and operation.	0

3.2.1.2 AFF-RES-WRZ3-0814

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account				Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect		
			Probability		Duration					Permanence				Con	Opp
			Con	Op	Con	Op				Con	Op				

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	There is potential for the new reservoir to act as a recreation site and may therefore result in minor positive effects during operation in terms of recreation. There will be minor negative construction phase effects on transport infrastructure and potential knock on effects for critical services and industries. New reservoir location covers a block of BAP priority habitat deciduous woodland, and the pipeline passes 100m from Houghton Regis Marl Lakes SSSI, comprising rare chalk/limestone wetland habitats. Therefore there will likely be minor negative effects during construction. There may be a minor negative effects on landscape during construction phase, however the residual operational effect is likely to be neutral. There are likely to be minor negative effects during operation on the hydromorphology of several river channels and also on groundwater quantity and quality. In addition to these impacts it is predicted that there will be construction phase minor negative effects on both historic environment assets and agricultural land during construction phase. However, appropriate reinstatement and mitigation should reduce the operational phase effect to neutral.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.5Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	There is potential for the new reservoir to act as a recreation site and may therefore result in minor positive effects during operation in terms of recreation. There will be minor negative construction phase effects on transport infrastructure and potential knock on effects for critical services and industries. New reservoir location covers a block of BAP priority habitat deciduous woodland, and the pipeline passes 100m from Houghton Regis Marl Lakes SSSI, comprising rare chalk/limestone wetland habitats. Therefore there will likely be minor negative effects during construction. There may be a minor negative effects on landscape during construction phase, however the residual operational effect is likely to be neutral. There are likely to be minor negative effects during operation on the hydromorphology of several river channels and also on groundwater quantity and quality. In addition to these impacts it is predicted that there will be construction phase minor negative effects on both historic environment assets and agricultural land during construction phase. However, appropriate reinstatement and mitigation should reduce the operational phase effect to neutral.	N/A	High	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	N/A	0	1	The new reservoir is anticipated to provide public access and serve as a new recreation site.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	High	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	N/A	0	1	The new reservoir is anticipated to provide public access and serve as a new recreation site. This may result in positive effects for local recreation assets. Minor significant residual impacts are anticipated for the River Ouzel. Subject to results from the WFD assessment, these minor impacts are not anticipated to impact recreational users. The anticipated levels of river water quality change are not assumed to have material impacts on the enjoyment of in-stream recreation for water craft users, and the use of the Rivers Ouzel and Lee by bathers is considered unlikely.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	The anticipated pipeline route partly follows the footprint of major roads and so is likely to cause such impacts. Well used roads will be affected by the scheme: A5120 0.6 (km), A5 0.1 (road crossed by pipeline), A4146 0.4, A4012 0.4. A roads assessed due to greater length affected and greater likelihood of significant congestion impacts. The construction traffic impact is not anticipated to be a significant impact for a longer duration than a few months (at any one location). No significant operation impacts are anticipated.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option requires a surface water intake and pumping station at Leighton Buzzard, a fully bunded dam embankment and raw water reservoir (capacity 5000 MI) at Honeywick Rye, and 13.3km of mains pipeline.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	None identified	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Low	?	Medium term (5 -25 years)	?	Temporary	?	Regional	High	Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction Potential for changes in hydrology of the site depending on depth of pipeline. Site supports rare chalk/limestone wetland habitats.	-1	0	Pipeline passes 200m from Totternhoe Chalk Quarry SSSI. At this distance no effect is anticipated. Pipeline passes ~100m from Houghton Regis Marl Lakes SSSI. This site comprises wetland habitats that are rare in Britain, confined to chalk or limestone areas. Depending on the depth of the pipeline this site may be affected by changes in hydrology.	?
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	?	Medium term (5-25 years)	?	Permanent	?	Local	Low	Divert route to reduce loss of BAP priority habitat deciduous woodland. If not possible, compensatory habitat likely to be required. Undertake ecological surveys. Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction.	-1	0	Abstraction point is adjacent to an area of BAP Priority habitat deciduous woodland, which stretches both up- and downstream from the abstraction point. Pipeline then passes through this habitat at this location. Honeywick Rye Reservoir location includes a block of BAP priority habitat deciduous woodland. Location also covers a series of ditches in agricultural land. Pipeline route is through several blocks of deciduous woodland and crosses several ditches.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include appropriate re-instatement and screening. Heritage and Landscape character assessments should be carried out where significant infrastructure works will be undertaken.	-2	-1	There are likely to be negative effects on landscape as a result of the new buildings and fully bunded dam embankment during the construction and operation phases. Mitigation measures such as screening/planting will reduce the residual effect during operational phase. However, the reservoir and dam embankment will result in a residual long-term negative effect during operation as they will remain prominent in the landscape post mitigation. The new raw water pipeline will also have negative effects during construction; however, following the reinstatement of the land it is predicted that there will be a residual neutral effect during operation.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	Medium	?	Short term (< 5 years)	?	Temporary	?	Local	Moderate		-1	0	There is the potential for minor negative effects during construction of the new pipeline, buildings and reservoir. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	This options requires new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydromorphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No treatment of water between abstraction and discharge	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Hydrogeological investigation and groundwater monitoring.	0	-1	Potential connection with the Upper Bedford Ouse Woburn Sands and Upper Bedford Ouse Chalk groundwater bodies and impacts would need to be assessed (likely minor positive impacts on the Chalk aquifer).	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Hydrogeological investigation and groundwater quality monitoring, implementation of trigger concentration.	0	0	Discharge into the River Lee which might be in hydraulic connection with the Chalk aquifer. If water quality is acceptable (checked via mitigation measures) there should be no negative impact.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Monitoring scheme and trigger levels downstream of abstraction	0	-1	Abstraction from the River Ouzel and new reservoir might have some impact on WFD status or downstream users in the Ouzel catchment. Discharge in the Lee River should have positive impact if water quality is acceptable.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include appropriate re-instatement	0	0	The pipeline route is partially located within some areas of floodplain. However, this area is not significant, and once reinstatement has occurred there should be no loss of floodplain.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Heritage impact assessment should be carried out to determine the effect of the pipeline and in particular the new reservoir on designated heritage assets.	-1	-1	The construction of the new raw water pipeline is likely to be visible from a number of Listed Buildings. However, appropriate reinstatement of any land affected following construction is anticipated to result in negative effects being short-term, temporary and it is therefore predicted that the operational phase for the new raw water pipeline will have a residual neutral effect. The site of the new reservoir is within 900m of a number of Listed Buildings and the Tatternhoe Castle Scheduled Monument. The reservoir is likely to be visible in part to these designated heritage assets given their elevation and the Scheduled Monument looks down the Ouzel Valley. There is therefore the potential for negative effects during construction and operation of the new reservoir. There is a significant level of uncertainty at this stage as the precise location of the reservoir and height of the bunded dam embankment are not known.	-1

	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipelines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses an area of grade 3 agricultural land. Therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

3.2.1.3 AFF-RES-WRZ3-0815

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	There will be minor negative construction phase effects on transport infrastructure and potential knock on effects for critical services and industries. There is the potential for BAP priority habitats to be affected during construction of the pipeline. This may therefore result in a minor negative effect during construction phase. The proximity of the option to the Chilterns AONB mean there will be likely to be a moderate negative effect on Landscape during construction with residual minor negative effect during operation. There will be minor negative effects on Affinity Water's carbon footprint during construction and operation. The option may also have minor negative effects on the local environments resilience to climate change. The option may also have operation phase negative minor effects on ground and surface water bodies. There are two Scheduled Monuments (at Butler Manor and Ivinghoe Aston) which are located approximately 200m from the new Reservoir location at Edelsborough. These are likely to experience moderate negative effects during construction with minor negative effects during operation. The pipeline route crosses an area of grade 2 agricultural land and will therefore have moderate negative construction phase effects.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.5Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The anticipated levels (minor significant impact at operation and construction) of river water quality change are not anticipated to have material impacts on the enjoyment of in-stream recreation during construction. However, the new CHAU and Edelsborough Reservoirs are not anticipated to be accessible to the public.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	there is access to the River Ouzel by public footpath. However, other sections of water courses crossed by the pipeline are not followed by public footpaths and so are anticipated to be inaccessible.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	Several A and B roads are anticipated to experience congestion during construction of this scheme. The construction traffic impact is not anticipated to be a significant impact for a longer duration than a few months (at any one location). No significant operation impacts are anticipated. Well used roads will be affected by the scheme: A4012 0.4 (km), A4146 5.4, B489 5.6, Unclassified 2, A505 3. Pipe near M1 appears to be off-carriageway. A and B roads assessed due to greater length affected and greater likelihood of significant congestion impacts.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The option requires 22.6km of new mains pipeline, a new fully bundled reservoir, a new surface water intake and pumping station, water treatment works and the expansion of CHAU.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A - SSSI present within 100m of pipeline, separated by housing. No impact anticipated.	0	0	Pipeline passes within 100m of Dunstable and Whipsnade Downs SSSI, however pipeline is separated from this site by housing.	?
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	None identified, however detailed ecological survey required	?	?	None identified, however detailed ecological survey required	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		High	High	Medium term (5 -25 years)	Long term >25 years	Permanent	Permanent	Local	Low	Avoid loss of BAP priority habitat where possible. CEMP should be implemented during construction to avoid light, noise and dust disturbance to habitats.	-1	0	Abstraction point is adjacent to an area of BAP Priority habitat deciduous woodland, which stretches both up- and downstream from the abstraction point. Pipeline then passes through this habitat at this location. Pipeline passes adjacent to BAP priority habitat traditional orchard at Northall Footprint of new reservoir with WTW at Edelsborough covers an area of BAP priority habitat traditional orchard, and is adjacent to areas of deciduous woodland. Site is also at the location of one of the branches of the River Ouzel. Clean water pipeline to CHAU is adjacent to broadleaved deciduous woodland and lowland calcareous grassland Depending on direction of CHAU expansion there is potential for loss of broadleaved deciduous woodland. Potential for noise, light and dust disturbance during this expansion.	
	5.e. Provide opportunities for biodiversity enhancement?		?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls / roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	High	Mitigation measures should include appropriate re-instatement and screening. Heritage and Landscape character assessments should be carried out where significant infrastructure works will be undertaken.	-2	-2	There are likely to be negative effects on landscape as a result of the new buildings and fully bunded dam embankment during the construction and operation phases. Mitigation measures such as screening/planting will reduce the residual effect during operational phase. However, the dam embankment will result in a residual long-term negative effect during operation as they it is likely to remain prominent in the landscape post mitigation. There is the potential for a moderate significant long-term negative effect as the new reservoir is within 100m of the Chilterns AONB. The new raw water pipeline will also have negative effects during construction; however, following the reinstatement of the land it is predicted that there will be a residual neutral effect during operation. Part of the new route runs along the boundary of the Chilterns AONB.	-2
	6.b. Provide opportunities for landscape enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	

7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The pipeline route is partially located within the South Bedfordshire AQMA. There is the potential for minor negative effects during construction of the new pipeline, buildings and reservoir. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	This options requires new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydromorphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Hydrogeological investigation and groundwater monitoring.	0	-1	Potential connection with the Upper Bedford Ouse Woburn Sands groundwater body and impacts would need to be assessed.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction from the river shouldn't impact water quality of the aquifer.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Monitoring scheme and trigger levels downstream of abstraction	0	-1	Abstraction from the River Ouzel and new reservoir might have some impact on WFD status or downstream users.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-2	-1	There are two Scheduled Monuments (at Butler Manor and Ivinghoe Aston) which are located approximately 200m from the new Reservoir location at Edelsborough. These may experience significant short-term temporary negative effects in terms of setting and character of the surrounding area during construction phase. The long-term effect which the reservoir may have on these assets during operation is uncertain at this time and should be explored through further assessment. The raw water pipeline from Leighton Buzzard runs within 10m of a number of Listed Buildings. These heritage assets may experience short term temporary negative effect during excavation for the pipeline but re-instatement and mitigation measures should ensure the residual effect is neutral during operation.	-1
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipelines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-2	0	The pipeline route crosses a small area of grade 2 agricultural land and a larger area of grade 3 agricultural land. Therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

3.2.1.4 AFF-RES-WRZ6-0829

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	There will be moderate negative construction phase effects on transport infrastructure and potential minor knock on negative effects for critical services and industries. The option will also have minor negative operational phase effects on biodiversity in terms of impacts on SSSI's, SACs and BAP priority habitats. A small proportion of route for the new pipeline (approx 2 to 3 km) falls within the Surrey Hills AONB. As such, there will be moderate negative construction phase effects on landscape with minor residual negative effects. There will be	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		

	1.c. Enable the growth ambitions of the study area to be realised?	minor negative effects on Affinity Water's carbon footprint during construction and operation. The option may also have minor negative effects on the local environments resilience to climate change. The option may also have operation phase negative minor effects on ground and surface water bodies. The construction of the new raw water pipeline is likely to be visible from a number of Listed Buildings, a Scheduled Monument and a Registered Park and Garden. These are likely to experience minor negative effects during construction with minor negative effects during operation. The pipeline route crosses an area of grade 2 agricultural land and will therefore have moderate negative construction phase effects.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is assumed that the new reservoir will not be accessible to the public for bankside or instream recreation
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is assumed (but not known) that the River Wey at Tilford is occasionally used by water craft. The anticipated effects on water quality and flow are minor, and therefore anticipated to be immaterial for water craft users. Impacts might be perceived by bathers, though whilst there are sites suitable for swimming in Tilford, this activity has reportedly been prohibited by the Tilford Parish Council It is assumed that the new reservoir will not be accessible to the public for bankside or instream recreation
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There are no anticipated significant impacts to the accessibility of rivers during operation. The extent of anticipated water quality and flow impacts are not anticipated to significantly affect informal bankside recreation.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-2	0	The anticipated pipeline route follows the footprint of major roads and so is likely to cause such impacts. Well used roads will be affected by the scheme: A331 2 (km), A323 8.3, A322 8, A319 0.3, A30 0.2, B-roads and unclassified roads 13. The construction traffic impact is not anticipated to last longer than a few months. No significant impacts are anticipated during operation.
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-2	0	The option requires 38.9km of new mains pipeline, a new fully bunded reservoir, a new surface water intake and pumping station, water treatment works and the expansion of CHAU.
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	Medium	?	Medium term (5 -25 years)	?	Temporary	?	National	High	Depth of pipeline should be considered so as not to effect hydrology of designated sites. CEMP should be in place to avoid light, noise and dust disturbance to designated sites. HRA & in combination assessment are likely to be required. WFD assessment required. Works should take place outside of the nesting bird season to avoid disturbance to nightjar, woodlark and Dartford warbler, for which the Thames Basin Heaths SPA is designated	-1	0	1.6km from the abstraction point is Thursley, Hankley & Frensham Commons SSSI, SAC. Pipeline passes 25m from Moor Park SSSI, 100m of Ash to Brookwood Heaths SSSI, SAC, 100m from Whitmoor Common SSSI and Colony Bog and Bagshot Heath SSSI & SAC. These SSSIs are components of the Thames Basin Heaths SPA designated for Dartford warbler, nightjar & woodlark. Wetter habitats include bogs and wet heaths. Potential for these sites to be affected by water quality changes, changes in hydrology and disturbance during construction Potential for disturbance to nightjar, woodlark and Dartford warbler	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Medium	?	Medium term (5 -25 years)	?	Temporary	?	Regional	High	Depth of pipeline should be considered so as not to effect hydrology of designated sites. CEMP should be in place to avoid light, noise and dust disturbance to designated sites. In combination assessment may be required. WFD assessment required.	-1	0	1.6km downstream from the abstraction point is Thursley, Hankley & Frensham Commons SSSI. Pipeline passes 25m from Moor Park SSSI, 100m of Ash to Brookwood Heaths SSSI, 100m from Whitmoor Common SSSI and Colony Bog and Bagshot Heath SSSI. Potential for these sites to be affected by water quality changes, changes in hydrology and disturbance during construction	?
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	None identified. Ecological survey required	?	?	None identified. Ecological survey required	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Low	Habitat loss should be avoided where possible. CEMP should be in place to avoid light, noise and dust disturbance to designated sites.	-1	0	Pipeline goes along road through ancient woodland & deciduous broadleaved woodland, and passes adjacent to broadleaved woodland in multiple locations Footprint of the new West End Reservoir is over BAP habitat deciduous broadleaved woodland, several small drainage ditches and field margins with the potential for hedgerow severance. No sites associated with the expansion of Sunninghill Reservoir Potential for river corridor habitats at the River Wey to be lost or disturbed.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

		High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	High	Mitigation measures should include appropriate re-instatement and screening. Heritage and Landscape character assessments should be carried out where significant infrastructure works will be undertaken.	-2	-1	There are likely to be negative effects on landscape as a result of the new buildings and fully bunded dam embankment during the construction and operation phases. Mitigation measures such as screening/planting will reduce the residual effect during operational phase. However, the reservoir and dam embankment will result in a residual long-term negative effect during operation as they will remain prominent in the landscape post mitigation. The new raw water pipeline will also have negative effects during construction; however, following the reinstatement of the land it is predicted that there will be a residual neutral effect during operation. It is important to note that a small proportion of route for the new pipeline (approx 2 to 3 km) falls within the Surrey Hills AONB.	-1
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-1	-1	This options requires new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydromorphology could potentially be impacted.	
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	High	Hydrogeological investigation and groundwater monitoring.	0	-1	Potential connection with the Godalming Lower Greensand groundwater body and impacts would need to be assessed.	-1
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Abstraction from the river shouldn't impact water quality of the aquifer.	

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Monitoring scheme and trigger levels downstream of abstraction	0	-1	Abstraction from the River Wey might have some impact on WFD status or downstream users.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	-1	The construction of the new raw water pipeline is likely to be visible from a number of Listed Buildings, a Scheduled Monument and a Registered Park and Garden. However, appropriate reinstatement of any land affected following construction is anticipated to result in negative effects being short-term, temporary and it is therefore predicted that the operational phase for the new raw water pipeline will have a residual neutral effect. There are a number of Listed Buildings which are located within 150m of the new reservoir site. Construction activities may have a short-term temporary negative effect on these heritage assets. There is the potential for a residual negative long-term effect on the setting of these heritage assets during the operation of the reservoir as a result of the bunded dam embankment. There is a significant level of uncertainty at this stage as the precise location of the reservoir and height of the bunded dam embankment are not known.	-1
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipelines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-2	0	The pipeline route crosses an area of grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

3.2.1.5 AFF-RES-WRZ4-0832

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	There may be minor negative effects on recreational opportunities during construction phase as the pipeline route crosses water courses. There will be minor negative construction phase effects on transport infrastructure and potential knock on effects for critical services and industries. Abstraction from Brent Reservoir SSSI may affect water quality and the species and habitats that the site supports. Consequently there will be moderate negative construction and operation phase effects on SSSIs with minor construction and operation phase effects on BAP priority habitats. There will be moderate negative effects on landscape during construction with minor negative effects during operation. There will be moderate negative effects on Affinity Water's carbon footprint during construction and operation. The option may also have minor negative effects on the local environments resilience to climate change. The pipeline from HWFS NTW to HARE crosses several river channels and may have a minor negative construction and operational phase effect on hydro morphology. Abstraction from the BREN Reservoir is to be transferred via River Brent, which might have some impact on WFD status or downstream users. Consequently there may be moderate negative operation phase effects on the flow in the River Brent. There may also be minor negative and moderate negative construction phase effects on heritage assets and agricultural land.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 7.5MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The Grand Union Canal and BREN Reservoir are assumed to be navigable, though no changes (including improvements) to this are anticipated.	0
	2.b. Alter water levels that affect water-based recreation assets?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	Due to the urban nature of the local area, it is anticipated that the canal and reservoir are well used recreation sites. However, informal recreation is not anticipated to be affected by construction or operation activities. Conversely, the pipeline from HWFS NTW to HARE crosses watercourses (Alderbourne, Colne Frook and Colne (Confluence Chess to River Thames) with the potential for disturbance to water quality during construction works. These may have knock on effects on any water based recreational activities.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Regional	High	N/A	-1	0	The pipeline follows the route of several roads. Some traffic disruption may be experienced during construction. The construction traffic impacts is not anticipated to cause adverse impacts for a longer duration than a few months (at any one location), however localised impacts are anticipated to be experienced. No significant operation impacts are anticipated.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with the new pipeline	

4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires Installation of 9 additional booster pumps. Additional power supply and transformer to power the new booster pumps (Brent Aqueduct, Grand Union Canal and HWFS TW to Harefield). Installation of telemetry to report status of new booster pumps. A 9.75 MI upgrade of HARE and a 14.9km of 350mm Diameter Main.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-2
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	?	High	?	Long term >25 years	Temporary	Permanent	Regional	High	Potential for water quality changes and subsequent loss of suitable habitat. Provision of alternative habitat? Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction.	-2	-2	Abstraction from BREN Reservoir SSSI may affect water quality and the species and habitats that the site supports. Pipeline along overbridge which passes over Fray's Farm Meadows SSSI, potential for disturbance through noise and dust during construction. Pipeline crosses drain connected to, and within 100m of Ruislip Woods NNR and SSSI, comprising ancient woodland, grassland, ponds, stream and marshland. Potential for changes to hydrology depending on depth of pipeline	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	High	?	Long term >25 years	Temporary	Permanent	Local	High	Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction. Potential to re-route pipeline to avoid loss of priority habitats? Reinstate hedgerows after construction. Potential to create new hedgerows.	-1	-1	Depending on location of booster pumps at Grand Union Canal, BAP priority habitat deciduous woodland may be lost, or disturbed by noise, light or dust during construction. Pipeline passes adjacent to or through deciduous woodland, potential for loss of habitat or disturbance by noise, light or dust during construction. Pipeline crosses field margins, potential severance of hedgerows.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-1	-1	The new pipeline route travels through residential areas in Pinn. Therefore there will be a some short term temporary negative effects on residents associated with pipeline excavation work. Appropriate reinstatement measures are anticipated to result in residual effects being neutral during operation.	-1

	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality given the presence of existing transport infrastructure, such as the M25 and M40, to the option. The option is also unlikely to significantly affect traffic. It is noted that the route of the new pipeline passes through an AQMA and any traffic impacts within this area should be minimised.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-2	-2	New treatment works and pipe construction will result in energy and raw materials use, operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-2
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	This option could have negative effects on SSSIs and crosses several river channels.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline from HWFS NTW to HARE crosses several river channels whose hydro morphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	no groundwater abstraction in this scheme	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	no groundwater abstraction in this scheme	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Monitoring scheme and trigger levels downstream of abstraction	0	-2	Abstraction from the BREN Reservoir is to be transferred via River Brent, which might have some impact on WFD status or downstream users.	-2
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option runs through areas of 1 in 100 year flood plains. However, it will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include a heritage impact assessment, and full re-instatement of any land affected by construction.	-1	0	The new pipeline passes in close proximity to a number of Listed Buildings. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects of the new	0

	2.b. Alter water levels that affect water-based recreation assets?	geomorphology. However, discharge into the River Dour from Broomfield Banks may have a minor positive effect on river flows during operation. The new pipelines are within 40m of a Scheduled Monument as well as within 10m of a number of Listed Buildings. The new WTW is in close proximity to a listed building and Scheduled Monument. Consequently there will be minor negative construction and operation effects on Heritage. Additionally, there may be minor negative construction phase effects on agricultural land.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The anticipated levels (minor significant impact at construction) of river water quality change are not anticipated to have material impacts on the enjoyment of in-stream recreation.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	Well used roads will be affected by the scheme. Including: B2011 0.4 (km), A266 0.1, A258 0.1, Unclassified 5.3. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with new mains pipelines.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	Upgrades to booster pumping the new mains will require construction of new assets.	0
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Due to the distance and sensitivity of the closest designated sites no linking impact pathways are anticipated.	0	0	The River Dour intake to Dover Intermediate (Connaught) Service Reservoir pipeline route is located 900m from Dover to Kingsdown Cliffs SAC and is 4.4km from Lydden & Temple Ewell Downs SAC. The proposed pipeline from Broomfield banks to the River Dour is located 1.9km from Lydden & Temple Ewell Downs SAC. The pipeline is 3.8km from Etchingill Escarpment SAC. Due to the distance and sensitivity of the closest designated sites no linking impact pathways are anticipated.	0

<p>5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?</p>	<p>Medium</p>	<p>N/A</p>	<p>Medium term (5 -25 years)</p>	<p>N/A</p>	<p>Temporary</p>	<p>N/A</p>	<p>Regional</p>	<p>Moderate</p>	<p>Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction. Potential for changes in hydrology of the sites depending on depth of pipeline. Detailed ecological survey required.</p>	<p>-1</p>	<p>0</p>	<p>The River Dour intake to Dover Intermediate (Connaught) Service Reservoir pipeline route is located 900m from Dover to Kingsdown Cliffs SSSI, 2.1km from Folkestone Warren SSSI and 3.8km from Alkham, Lydden & Swingfield Woods SSSI.</p> <p>The proposed pipeline from Broomfield banks to the River Dour is located 100m from Alkham, Lydden & Swingfields Wood SSSI.</p> <p>Potential for acoustic, light and dust disturbance to Alkham, Lydden & Swingfields Wood SSSI during construction. Potential for changes in hydrology of the sites depending on depth of pipeline.</p>
<p>5.c. Impact on non-native species?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>No invasive species identified, however detailed ecological survey required.</p>	<p>?</p>	<p>?</p>	<p>No invasive species identified, however detailed ecological survey required.</p>
<p>5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?</p>	<p>Medium</p>	<p>N/A</p>	<p>Medium term (5 -25 years)</p>	<p>N/A</p>	<p>Temporary</p>	<p>N/A</p>	<p>Local</p>	<p>Low</p>	<p>Potential for acoustic, light and dust disturbance during construction. CEMP should be implemented during construction. Potential for changes in hydrology of the sites depending on depth of pipeline. Detailed ecological survey required.</p>	<p>-1</p>	<p>0</p>	<p>The River Dour intake to Dover Intermediate (Connaught) Service Reservoir pipeline route runs adjacent to BAP Priority habitat of deciduous woodland. The Dover Intermediate (Connaught) Service Reservoir is 13m from BAP Priority habitat deciduous woodland. The proposed pipe is 40m from BAP Priority habitat lowland calcareous grassland.</p> <p>The proposed pipeline from Broomfield banks to the River Dour runs adjacent to BAP Priority habitat deciduous woodland and is 150m from lowland calcareous grassland.</p> <p>Potential for acoustic, light and dust disturbance during construction to BAP Priority deciduous woodland. Potential for changes in hydrology of the sites depending on depth of pipeline.</p>
<p>5.e. Provide opportunities for biodiversity enhancement?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>?</p>	<p>Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.</p>	<p>?</p>	<p>?</p>	<p>Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.</p>

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Regional	High	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-2	-2	The new tertiary treatment works and new treated water pipeline fall entirely within the Kent Downs AONB. The new WTW work falls outside the AONB but is still in close proximity. Potential for a moderate residual negative effect during construction as a result of location within the AONB. During operation, the new pipeline will be buried; however, there is potential for a moderate negative effect on the AONB as a result of the new tertiary treatment and WTW as well as associated buildings. At this stage the precise size, design and layout of new buildings for the tertiary treatment works and WTW is not known. Mitigation, such as sensitive design and screening/ planting may help to reduce the significance of the effect during operation but this is uncertain at this stage.	-2
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phase would result in significant impacts on local air quality. However, it is noted that a very small proportion of new pipeline is within the Dover District Council AQMA	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will be likely to result in higher energy requirements during construction phase, therefore resulting in a higher carbon footprint. Operational energy increase is assumed to be minimal.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	0
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	National	Moderate	Design and construction methods should follow sustainable design principles. Ensure monitoring and Licencing of water abstraction.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	Construction of outfalls to the river body could impact the hydromorphology.	-1

	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	Moderate	Mitigation measures should include water quality monitoring of discharged effluent and in surface water bodies.	0	0	Potential impacts from the discharge of treated effluent into the Upper Dour and Dour (Kearsney to Dover) although assumed effluent will be treated to a suitable standard, and as such the impact is neutral.	
	10.c. Alter water table levels and amount of water within aquifers?	Low	Low	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	Moderate	Best construction practice and monitoring for nearby abstractions if dewatering is required during construction works. Hydrogeological investigation and groundwater monitoring.	-1	0	Dewatering might be required to install foundation works so there would be a short term impact on groundwater level and potential paths for pollution to groundwater body. Potential positive impact on water levels in Kent Chalk groundwater body, which is likely to be hydraulically connected to the river, although at this stage impact is uncertain.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Low	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	Moderate	Best construction practice. Mitigation measures during operation should include water quality monitoring.	-1	0	Dewatering might be required to install foundation works so there would be a short term impact on groundwater level and potential paths for pollution to groundwater body. Potential impacts from the discharge of treated effluent into the Upper Dour and Dour (Kearsney to Dover) which is likely to be hydraulically connected to the Kent Chalk groundwater body, however this will be required to meet a certain standard so an overall neutral impact is expected.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Monitoring scheme and trigger levels downstream of abstraction	0	1	Discharge into the River Dour from Broomfield Banks may have a positive impact on river flows which may improve conditions at downstream abstractions although at this stage the impact is uncertain.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Sections of this option are located within a floodplain area (identified by the Environment Agency) However re-instatement measures should avoid any loss of useable floodplain and measures are not likely to significantly increase the surface area of hardstanding within the option location.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High	Heritage impact assessment should be carried out to determine the effect of the pipeline and new structures on designated heritage assets.	-1	-1	The new pipelines are within 40m of a Scheduled Monument as well as within 10m of a number of Listed Buildings. The new WTW is in close proximity to a listed building and Scheduled Monument. There is therefore potential for minor negative effects during the construction and operational phases. At this stage the precise size, design and layout of new buildings for the tertiary treatment works and WTW is not known. Mitigation, such as sensitive design and screening/ planting may help to reduce the significance of the effect during operation but this is uncertain at this stage.	-1

	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses grade 2 agricultural land, therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

4. Treatment options

4.1 NTW

4.1.1.1 AFF-NTW-WRZ4-1003

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option will have moderate positive effects in terms of providing adequate supply of water. This option may have a minor negative operation phase effect on public rights of way due to the anticipated loss of open farm land which may detract from the aesthetics of the footpath along the River Colne. The option may also have minor negative effects during construction on landscape. It is estimated that this option will also have moderate negative effects on Affinity Waters carbon footprint during construction and operation. it may also have a minor negative effect on the environments resilience to climate change. Dewatering might be required to install foundation works therefore there may be minor construction phase negative effects on surface and ground water bodies in the vicinity.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 50MI/d equates to a moderate positive effect	2	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	2.c.. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	N/A	N/A	0	-1		There are no public rights of way or public facilities on the anticipated site footprint. Despite the lack of significant impacts on the local landscape (given the urban/industrial locality and expected mitigation planting) in operation, it is anticipated that loss of open farmland (at the site) may detract from aesthetics of the footpath along River Colne (to immediate east of site) in the long term.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A

4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires new treatment works and associated infrastructure.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	National	High	Unlikely to be necessary	?	0	Very low chance for changes in hydrology to South West London Waterbodies SPA/Ramsar site	?
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	?	?	?	?	?	?	?	Construction and operation may affect nearby deciduous woodland. CEMP should be in place.	?	?	Construction and operation may affect nearby deciduous woodland.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	Unknown - ecological survey required to identify presence/absence of non-native species.	?	?	Unknown - ecological survey required to identify presence/absence of non-native species.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for planting of pollinator supporting plant species and green roofs/ walls.	?	?	Unknown - ecological survey required.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Mitigation measures should include appropriate re-instatement and screening. Heritage and Landscape character assessments should be carried out where significant infrastructure works will be undertaken.	-1	0	There are likely to be minor negative effects on landscape during construction phase. Mitigation measures such as screening/planting will reduce the residual effect during operational phase. Presence of the M25 reduces the likelihood for negative effects on the landscape.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality given the presence of the M25 adjacent to the site. However, it is noted that the sites is partially within an AQMA.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	Local	?	Construction phase activities are likely to increase Affinity Water's carbon footprint significantly. Operation phase effects are likely to increase the footprint.	-2	-2	Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation activities are likely to result in increased emissions as well.	-2

	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	N/A	Best construction practice and monitoring for nearby abstractions if dewatering is required during construction works	-1	0	Dewatering might be required to install foundation works so there would be a short term impact on groundwater level and potential paths for pollution to groundwater body.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	N/A	Best construction practice if dewatering is required during construction works	-1	0	Dewatering might be required to install foundation works so there would be a short term impact on groundwater level and potential paths for pollution to groundwater body.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	N/A	Best construction practice and monitoring for nearby abstractions if dewatering is required during construction works	-1	0	Dewatering might be required to install foundation works so there would be a short term impact on groundwater level and potential paths for pollution to groundwater body.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 - 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

4.1.1.2 AFF-NTW-WRZ4-1005

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration	1.a. Provide affordable access to clean water adequate to support health?	This option will have a major positive effect in terms of adequately supply water. This option may have a minor negative operation phase effect on	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	3	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO	3

ambitions of the study area?	1.b. Ensure that customers are not disproportionality affected by cost?	public rights of way due to the anticipated loss of open farm land which may detract from the aesthetics of the footpath along the River Colne. It will also have a major negative effect regarding Affinity Water's carbon footprint. Additionally, there may be minor negative effects on the environment's resilience to climate change. Dewatering might be required to install foundation works therefore there may be minor construction phase negative effects on surface and ground water bodies in the vicinity.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	3	provided by the option. 100 MI/d equates to a significantly positive effect		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	3			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	2.c.. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	N/A	N/A	0	-1		There are no public rights of way or public facilities on the anticipated site footprint. Despite the lack of significant impacts on the local landscape (given the urban/industrial locality and expected mitigation planting) in operation, it is anticipated that loss of open farmland (at the site) may detract from aesthetics of the footpath along River Colne (to immediate east of site) in the long term.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires new treatment works and associated infrastructure.	0	
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	N/A	-1	0		The option will temporarily result in higher levels of waste production.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	National	High	Unlikely for any effect, however if increased abstraction is required to support this option under another scheme/ option, in combination HRA may be required.	?	0	Very low chance for changes in hydrology to South West London Waterbodies SPA/Ramsar site	?	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	?	Unknown - ecological survey required to identify presence/absence of non-native species.	?	?		Unknown - ecological survey required to identify presence/absence of non-native species.

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	?	?	?	?	?	?	?	Construction and operation may affect nearby deciduous woodland and the River Colne. CEMP should be in place.	?	?	Construction and operation may affect nearby deciduous woodland and the River Colne.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for planting of pollinator supporting plant species and green roofs/ walls.	?	?	Unknown - ecological survey required.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Mitigation measures should include appropriate re-instatement and screening. Heritage and Landscape character assessments should be carried out where significant infrastructure works will be undertaken.	-1	0	There are likely to be minor negative effects on landscape during construction phase. Mitigation measures such as screening/planting will reduce the residual effect during operational phase. Presence of the M25 reduces the likelihood for negative effects on the landscape.	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality given the presence of the M25 adjacent to the site. However, it is noted that the sites is partially within an AQMA.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	Local	?	Construction phase activities are likely to increase Affinity Water's carbon footprint significantly. Operation phase effects are likely to increase the footprint.	-3	-3	Construction phase activities will result in an increase to Affinity Water's carbon footprint. The duration of these activities will be short term and temporary however the effects (i.e. carbon emitted) will be permanent. Operation activities are likely to result in increased emissions as well.	-3
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	N/A	Best construction practice and monitoring for nearby abstractions if dewatering is required during construction works	-1	0	Dewatering might be required to install foundation works so there would be a short term impact on groundwater level and potential paths for pollution to groundwater body.	

	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	N/A	Best construction practice if dewatering is required during construction works	-1	0	Dewatering might be required to install foundation works so there would be a short term impact on groundwater level and potential paths for pollution to groundwater body.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	N/A	Best construction practice and monitoring for nearby abstractions if dewatering is required during construction works	-1	0	Dewatering might be required to install foundation works so there would be a short term impact on groundwater level and potential paths for pollution to groundwater body.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

4.1.1.3 AFF-NTW-WRZ1-1011

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operation effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option will have moderate positive effects in terms of providing adequate supply of water. The new WTW site is located 750m away from the Ruislip SSSI and NNR. As such, there is potential for disturbance to this SSSI during construction and potential for disturbance to BAP priority deciduous woodland. Therefore this option may have minor negative effects during construction. There are likely to be minor negative effects on landscape during construction phase. There is also likely to be minor negative effects during operation phase in terms of Affinity Water's carbon footprint. Additionally, there may be minor negative effects on the environment's resilience to climate change. Dewatering might be required to install foundation works, therefore there may be minor construction phase negative effects on surface and ground water bodies in the vicinity. This option has the potential to affect the setting of a number of Listed Buildings and will therefore have minor negative effects during both construction and operation. The	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 50MI/d equates to a moderate positive effect.	2
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	2		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No riverine (or stillwater) impacts are anticipated as part of this scheme.	0
	2.b. Alter water levels that affect water-based recreation assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No riverine (or stillwater) impacts are anticipated as part of this scheme.	

	2.c.. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	pipeline route also crosses an area of grade 2 agricultural land. Assuming appropriate re-instatement there will be minor negative effects during construction.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The construction impacts are not anticipated to be significant as it is anticipated that the footpath will be rerouted whilst the construction is underway. No operation impacts are anticipated.		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Construction work is not anticipated to occur outside the anticipated site boundaries (which contains no roads). Therefore no effects are predicted.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A		-1	0	The option requires new treatment works and associated infrastructure.	0
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A		-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	?	?	?	?	?	?	?	?		?	?	If increased abstraction required, potential for in combination effects of changes in hydrology.	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		Low	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	Low	CEMP should be implemented during construction due to potential for acoustic, light and dust disturbance during construction. Detailed ecological survey required.		-1	0	The new WTW site is located 750m away from Ruislip SSSI and National Nature Reserve (NNR). Potential for disturbance to SSSI during construction.	
	5.c. Impact on non-native species?		?	?	?	?	?	?	?	?	Ecological survey required to identify presence/absence of non-native species.		?	?	Ecological survey required to identify presence/absence of non-native species.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	?	Long term >25 years	?	Permanent	?	Local	?	Avoid loss of BAP Priority habitat where possible. If loss of BAP Priority Habitat cannot be avoid then compensatory habitats will be required. CEMP should be implemented during construction due to potential for acoustic, light and dust disturbance during construction. Detailed Ecological survey required.		-1	?	Potential for loss of BAP Priority habitat deciduous woodland within new WTW site. Potential loss of hedgerow habitat. The site is adjacent to French Grove ancient woodland. Potential for noise, light and dust disturbance during construction and operation. Potential for protected species to be affected. Ecological survey required. The new WTW is 240m from Bishops Wood CWS which also has the potential for noise, light and dust disturbance during construction.	?	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for planting of pollinator supporting plant species and green roofs/ walls.		?	?	Potential for planting of pollinator supporting plant species and green roofs/ walls.	?	

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-1	-1	There are likely to be minor negative effects on landscape during construction phase. Mitigation measures such as screening/planting will reduce the residual effect during operational phase, however a minor residual negative effect is likely to remain as a result of development on a greenfield location and proximity to Mount Vernon Hospital and the Riverside recreation club.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	0
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for dust to be produced during the construction phase and this could affect the nearby hospital; however, it is assumed that there is suitable mitigation available at the development control/ project level to minimise impacts and reduce residual effects. There is unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-2	-1	This options requires significant new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Proving geology at site to establish thickness of London Clay. Best construction practice and monitoring for nearby abstractions if dewatering is required during construction works	-1	0	Dewatering might be required to install foundation works which could impact on Radlett Tributaries aquifer so there could be a short term impact on groundwater level.	

	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Proving geology at site to establish thickness of London Clay. Best construction practice if dewatering is required during construction works	-1	0	Dewatering might be required to install foundation works which could impact on Radlett Tributaries aquifer so there could be potential paths for pollution to groundwater body.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	Proving geology at site to establish thickness of London Clay. Best construction practice and monitoring for nearby abstractions if dewatering is required during construction works	-1	0	Dewatering might be required to install foundation works which could impact on Radlett Tributaries aquifer so there could be a short term impact on groundwater level.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Medium	Medium	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Heritage impact assessment should be carried out to determine the effect of the new WTW on the historic environment.	-1	-1	This option has the potential to affect the setting of a number of Listed Buildings. Negative effects are more likely to be of significance during construction but there is the potential for appropriate screening. Mitigation such as planting/screening should reduce the significance of the residual negative effect during operation. It should be noted that it is not known at this stage if there are any prominent views from the Listed Buildings to the proposed site.	-1
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipelines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses an area of grade 2 agricultural land. Therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

4.1.1.4 AFF-NTW-WRZ4-1042

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The site for this option is located within the Chilterns AONB. This option requires construction of significant new infrastructure in a peri-rural setting of high landscape value. Consequently there will be moderate negative effects during construction and minor negative effects during operation. There is also likely to be minor negative effects during operation. There is also likely to be minor negative effects during operation.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. OMI/d equates to a negligible effect.	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	

	2.b. Alter water levels that affect water-based recreation assets?	effects during operation phase in terms of Affinity Water's carbon footprint. Additionally, there may be minor negative effects on the environment's resilience to climate change.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c.. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is likely to be some works traffic generated during construction. This is not expected to lead to significant impacts as the site is on a minor road that is not anticipated to experience congestion as a consequence.
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	N/A	-1	0	The option requires new treatment works and associated infrastructure.	0
	4.b. Result in higher levels of reuse of waste?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	N/A	-1	0	The option will temporarily result in higher levels of waste production.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	None identified	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	None identified. However, associated schemes may impact Grafham Water SSSI which is distant from the option, but an associated scheme.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	?	Detailed ecological investigation and desk study required.	?	?	None identified. Detailed ecological investigation and desk study required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	Low	Medium term (5 -25 years)	Medium term (5 -25 years)	Permanent	Permanent	Local	Low	Use of CEMP to reduce noise/dust disturbance to adjacent woodland. Detailed ecological investigation and desk study required.	0	?	Land required is adjacent to BAP priority habitat deciduous woodland. Potential for disturbance during construction. Associated schemes (i.e. increased abstraction) may impact Grafham Water SSSI, designated for wintering and passage bird species, which is distant from the scheme.		
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Detailed ecological investigation and desk study required - potential for green roofs/ walls and planting of native wildflower species.	?	?	Detailed ecological investigation and desk study required.		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	High	Mitigation measures should include appropriate re-instatement and screening. Heritage and Landscape character assessments should be carried out where significant infrastructure works will be undertaken.	-2	-1	The site for this option is located within the Chilterns AONB. This option requires construction of significant new infrastructure in a peri-rural setting of high landscape value. There will be temporary negative effects associated with construction, and long term irreversible effects on landscape setting and character associated with the completed infrastructure.	-1	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).

7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-2	-1	This options requires significant new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	-1
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No groundwater or surface water bodies near the NTW	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No groundwater or surface water bodies near the NTW	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No groundwater or surface water bodies near the NTW	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No groundwater or surface water bodies near the NTW	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No groundwater or surface water bodies near the NTW	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

4.1.1.5 AFF-EGW-WRZ4-1064

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option affects numerous well served roads and will therefore have moderate construction phase effects on strategic transport infrastructure with knock on minor negative effects on critical services and industries. The option will also have minor negative construction phase effects on the Ruislip Woods SSSI and nearby BAP priority habitat. The operation phase effects on biodiversity are uncertain. Regarding landscape, the option is likely to have a minor negative effect during both construction and operation. The pipeline route also passes through an AQMA and as such, the option has the potential to create a minor negative effect on air quality during construction. The option will result in a minor negative effect on Affinity Water's carbon footprint during operation and as it requires further abstraction it may result in a minor negative operation phase effect with regards to the resilience of the local environment to climate change. Furthermore the pipeline may have a minor negative effect on the hydro morphology of rivers during construction and there may also be minor negative effects on surface water and groundwater bodies. The new pipeline is within close proximity to heritage assets and may therefore have minor negative effects during construction and operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 9 MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	It is anticipated that the River Pinn and Yeading Brook are not used by water craft in the vicinity of anticipated impacts due to the size of the water body and availability of more navigable water bodies nearby (e.g. River Colne, canals). The anticipated levels (minor significant impact at construction) of river water quality change are not anticipated to have material impacts on the enjoyment of in-stream recreation.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	0	0	The construction impacts on footpaths are anticipated to be insignificant as it is anticipated that the footpaths will be rerouted whilst the pipeline construction is underway. No operation impacts are anticipated.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-2	0	Well used roads will be affected by the scheme: A4180 0.1 (km), A4090 4.1, A4127 1.9, A404 0.4, A4005 0.7, Unclassified 6.6. "	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/-uA	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-2	0	There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with the new pipeline.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	N/A	Short term (< 5 years)	N/A	Permanent	N/A	National	Moderate		-2	0	Upgrading of the treatment works and new mains pipework will require use of raw materials	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	None identified.	?

biodiversity including designated and other important habitats and species?	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	?	Regional	Moderate	A CEMP should be in place during construction, and ecological surveys are required.	-1	0	The ICKE site is 321m from Ruislip Woods Site of Special Scientific Interest (SSSI). The ICKE site is 2.8km from Mid Colne Valley SSSI. The HARR is 4.4km from BREN Reservoir SSSI. The proposed pipeline is 1.8km from Frays Farm Meadows SSSI, 2.1km from Denham Lock Wood SSSI, 3.1km from Harefield Pit SSSI, 4km from Old Rectory Meadows SSSI, 4.1km from Old Park Wood SSSI, and 4.6km from Kingcup Meadows & Oldhouse Wood SSSI. Potential for acoustic, light and dust disturbance to Ruislip Woods SSSI during construction of the boosters and boreholes at the ICKE site.
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Local	Low	A CEMP should be in place during construction, and ecological surveys are required.	-1	0	The ICKE site is 80m from BAP Priority habitat wood quality semi-improved grassland. The proposed pipeline route is adjacent to BAP Priority habitat good quality semi-improved grassland and deciduous woodland. Potential for acoustic, light and dust disturbance to BAP Priority habitat deciduous woodland and good quality semi-improved grassland during construction of the pipeline.
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-1	-1	The new pipeline will be buried so will not have any negative effects on the landscape during the operational phase. There is the potential for minor negative effects as a result of the new reservoir and treatment works but this is uncertain at this stage. Mitigation measures such as screening/ planting should reduce the significance of any residual negative effects during operation so that they are minor. The pipeline route travels through multiple residential areas. Therefore, there will be short-term temporary negative effects on residents associated with pipeline excavation work of residential streets, but not domestic properties. Residents will not be affected by the pipeline during the operational phase as it will be buried. The new reservoir and treatment works could also affect the landscape for a number of residents depending on the level of mitigation provided. However, this is uncertain at this stage.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Any proposal for this option should seek to reduce impacts on traffic during the construction phase of the pipeline.	-1	0	It is considered unlikely that the construction or operational phases would result in significant impacts on local air quality. However, it is noted that the pipeline route passes within an AQMA. There are likely to be negative effects on air quality during construction of the new pipeline as a result of increased traffic.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	High	Short term (< 5 years)	Medium term (5 -25 years)	Permanent	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	-2	-1	Upgrading of the treatment works and new mains pipework is likely to result in a significant increase in energy use for construction and operation. Upgrading of the treatment works and new mains pipework will require use of raw materials	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. By upgrading supply resilience this option should result in positive effects on the resilience of the company to the effects of climate change.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licenced.	-1

10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	N/A	Short term (< 5 years)	Long term >25 years	Temporary	N/A	Local	Low	Best construction practice.	-1	0	The pipeline crosses several river channels whose hydromorphology could potentially be impacted.	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	High	Undertake assessment of potential effect of increased abstraction on groundwater. Implement groundwater level monitoring and trigger levels.	0	0	The option involves restarting abstraction from an existing borehole at ICKE. There is potential for this to have a minor negative effect on the levels in the Chalk groundwater body. An impact assessment might be required.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	N/A	Long term >25 years	Temporary	Temporary	Regional	High	Monitor water quality regularly and set pollutant concentration trigger levels given existing groundwater quality issues associated with nearby landfill.	-1	0	A WFD assessment will be required to quantify the impact on the surface water and groundwater bodies during construction of the new treatment plant as well as potential in combination effects on surface water bodies during pipeline construction.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	Low	N/A	Long term >25 years	Temporary	Temporary	Local	Low	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	-1	0	Potential water quality impacts to River Pinn and Heading Brook during construction of the pipeline. Potential for impacts to aquatic habitats and species. Potential impact to River Pinn and Radlett Tertiaries Groundwater body, through construction of new treatment plant. Abstraction will also impact groundwater levels of the Mid Chilterns Chalk Groundwater body.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run-off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Medium	Medium	Short term (< 5 years)	Short term (< 5 years)	Temporary	Temporary	National	High	Heritage impact assessment should be carried out to determine the effect of the pipeline and reservoir on designated heritage assets.	-1	-1	The new pipeline is within 40m of a Scheduled Monument and within 20m of a significant number of Listed Buildings, additionally, the new HARR is within 50m of a Registered Park and Garden. There is therefore potential for negative effects during the construction phase. Appropriate reinstatement of any land affected should ensure that negative effects are reduced during the operational phase. However there may be minor negative residual effects.	-1
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	At this stage it is not considered likely that any water dependent heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of	14. a. Impact upon best and most versatile agricultural land (ALC grades	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts anticipated	0

mineral resources?	1 – 2)?																			
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5. Reuse options

5.1 EFF

5.1.1.1 AFF-EFF-WRZ3-0180

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	It is assumed that the option will result in the loss of the Bragbury Lane Hedgerow CWS, and also result in minor negative construction phase effects on the Bragbury Lane Scrub CWS and ancient woodland, and BAP priority deciduous woodland. Assuming appropriate mitigation and compensatory habitat measures, there will be a minor negative construction phase effect. Due to the greenfield nature of the site it is considered that there may be a moderate negative effect on landscape during construction. However, mitigation including screening/planting should result in a minor negative effect during operation. The option requires new infrastructure and will therefore result in a minor negative effect on Affinity Water's carbon footprint. With regards to the local environment's resilience to climate change, further abstraction may have a minor negative operational effect. The option may also have a minor negative operational phase effects on surface water bodies with regards to naturalisation and quality of water. There may also be minor negative effects on the aquifer as this connected to the river. There may also be a minor negative effect on heritage assets during construction phase.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	This option requires a river intake and pumping station at Marden Ash (River Roding), a new fully bunded bankside storage reservoir located at Birds Green, an onsite Water Treatment works and pumping station. Additionally, it will require 32.2km of mains pipeline to RYHI.	0
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0		
5. Protect and enhance	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified	0	0	None identified.	?

biodiversity including designated and other important habitats and species?	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None identified.	0	0	The proposed sewage treatment works (STW) is located 2.8km from Benington High Wood Site of Special Scientific Interest (SSSI) and is 3.7km from Knebworth Woods SSSI. Given the distance of the STW and the closest SSSI, no adverse impacts are anticipated.	
	5.c. Impact on non-native species?	?	?	?	N/A	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Low	Loss of designated sites and notable habitat should be avoided if possible. If unavoidable, compensatory habitat likely to be required. CEMP should be implemented during construction.	-1	0	Bragbury Lane Hedgerow County Wildlife Site (CWS) is within the centre of the proposed footprint of the STW. The STW is 39m from Bragbury Lane Scrub CWS and 591m from Astonbury Wood CWS which is also designated as ancient woodland. The STW is 157m from BAP Priority habitat deciduous woodland. It is assumed that the STW will result in the loss of the Bragbury Lane Hedgerow CWS. There is potential for acoustic, light and dust disturbance during construction.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	Moderate	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures	-2	-1	Potential for moderate negative effects during construction on a relatively open greenfield site. Mitigation including screening/planting should reduce the significance of the effect during operation.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects on local air quality during construction and operation but it is unlikely to be of significance.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	N/A	Low	N/A	Long term >25 years	N/A	Permanent	National	Moderate	Construction and operation activities should follow sustainable design principles.	0	-1	This options requires significant new infrastructure which will use energy and raw materials in construction. Operation will result in increased energy use. This is likely to have a negative impact on the carbon footprint of the Company.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	?	Construction and operation activities should follow sustainable design principles.		2	Predicted climatic changes in England include hotter and drier summers. By upgrading the storage capacity this option should result in positive effects on the resilience of the company to the effects of climate change.	

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline is not likely to have permanent adverse affects.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Moderate	Best construction practice. CEMP in place. Adopt a design that would limit river channel erosion.	-1	-1	Possible erosion of banks at the discharge location during construction and operation.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Treat water to potable standards before release to the Stevenage Brook. Monitor river water quality.	0	-1	The scheme would provide tertiary treated effluent to Stevenage Brook and the River Middle Beane. Discharge of water could increase nutrients content and alter water quality in the receiving water body.	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Beneficial so no mitigation needed.		2	This scheme is to increase river flows in river Beane via discharge of treated effluent in Stevenage Brook. Chalk is unconfined at that location so there is a hydraulic connection and this would potentially increase recharge into the aquifer.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	Low	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	Regular testing of discharge effluent and automatic systems to alert in case of failure of treatment devices. Groundwater quality monitoring	0	-1	River and aquifer are hydraulically connected. Although discharged water is of good quality there could be slight negative impact due to potential increase in nutrients.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Beneficial so no mitigation needed.	0	2	This scheme is to increase river flows in river Beane via discharge of treated effluent in Stevenage Brook.	2
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	Heritage impact assessment should be carried out to determine the effect of the new STW on designated heritage assets.	-1	0	The construction phase of the STW could affect the setting of a number of listed buildings. Mitigation including screening/planting should reduce the significance of the effect during operation.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipelines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No impacts predicted	0

5.1.1.2 AFF-EFF-WRZ7-0605

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option will have minor negative construction phase effects on the strategic transport network with minor negative knock on effects on critical services and industries. The trench and associated pipeline required by the option is within BAP Priority habitat coastal vegetated shingle and deciduous woodland. Assuming appropriate mitigation and compensatory habitat measures, there will be a moderate negative construction phase effect. The option requires a new desalination plant and approximately 500m of the pipeline will be located in the Kent Downs AONB. Consequently there will be moderate negative effects during construction and minor negative effects during operation on landscape. The option requires new infrastructure and will therefore result in a minor negative effect on Affinity Water's carbon footprint during operation. With regards to the local environment's resilience to climate change, further abstraction may have a minor negative operational effect. The option will have a minor negative effect on surface water bodies through altering hydromorphology. The option will also have moderate construction phase effects on groundwater bodies due to the re-injection of treated water and abstraction close to the sea water interface. There are also likely to be moderate negative construction phase effects on heritage assets, assuming appropriate re-instatement and mitigation this should result in a minor negative effect during operation.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5MI/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The option will have a minor negative effect on surface water bodies through altering hydromorphology. The option will also have moderate construction phase effects on groundwater bodies due to the re-injection of treated water and abstraction close to the sea water interface. There are also likely to be moderate negative construction phase effects on heritage assets, assuming appropriate re-instatement and mitigation this should result in a minor negative effect during operation.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		Access is not anticipated to change as a result of this scheme.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	The option will have a minor negative effect on surface water bodies through altering hydromorphology. The option will also have moderate construction phase effects on groundwater bodies due to the re-injection of treated water and abstraction close to the sea water interface. There are also likely to be moderate negative construction phase effects on heritage assets, assuming appropriate re-instatement and mitigation this should result in a minor negative effect during operation.	Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The anticipated pipelines' routes follow the footprints of several roads and so are anticipated to cause such impacts. Well used roads will be affected by the scheme: A259 3.2 (km), A261 0.1, Unclassified 1.6. The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		Medium	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	N/A	-1	0		There could be indirect negative effects on critical services and industries due to congestion etc. caused by construction works associated with the new pipeline.
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	The option will have a minor negative effect on surface water bodies through altering hydromorphology. The option will also have moderate construction phase effects on groundwater bodies due to the re-injection of treated water and abstraction close to the sea water interface. There are also likely to be moderate negative construction phase effects on heritage assets, assuming appropriate re-instatement and mitigation this should result in a minor negative effect during operation.	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	-1	0	The option requires new 390m main from STW to tertiary treatment plant, 300mm diameter. New 1000m main (300mm diameter) from tertiary treatment to aquifer injection (50m French drain). A new 2.22 km pipeline along the trench to connect the 4 wet wells with the Desalination plant, and 5.56km pipeline from Desalination plant to Saltwood Reservoir, 250mm diameter.	0	
	4.b. Result in higher levels of reuse of waste?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	N/A	Moderate	N/A	N/A	-1	0		The option will temporarily result in higher levels of waste production.

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	?	?	?	?	?	?	National	High	Detailed ecological surveys required, including ecology and hydrology. HRA required. Due to proximity of the scheme to Folkestone and Etchinghill Escarpment SAC located adjacent to the M20, there is potential for increased traffic flows from the scheme to result in increases in atmospheric pollution deposition on the SAC. Traffic modelling and potential subsequent air quality modelling required to support Habitat Regulations Assessment.	?	?	Trench and pipeline are 233m from Dungeness, Romney Marsh and Rye potential SPA, 7.1km from Dungeness, Romney Marsh and Rye Bay SPA and Ramsar site, and Dungeness SAC. Potential effect on Dungeness, Romney Marsh and Rye potential SPA, Dungeness, Romney Marsh and Rye Bay SPA and Ramsar, and Dungeness SAC. Habitat Regulations assessment investigations may be required to ensure no likely significant effects result. The site is approximately 3.5km from Folkestone and Etchinghill Escarpment SAC which is located on the M20. Due to proximity of the scheme to Folkestone and Etchinghill Escarpment SAC located adjacent to the M20, there is potential for increased traffic flows from the scheme to result in increases in atmospheric pollution deposition on the SAC.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No mitigation required.	0	0	Pipeline passes 270m from Lympne Escarpment SSSI. However as this SSSI is an escarpment no effect is anticipated.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	?
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	High	Avoid loss of BAP Priority habitat if possible. If not possible, compensatory habitat may be required. CEMP should be in place during construction.	-2	0	Trench and associated pipeline is within BAP Priority habitat coastal vegetated shingle and BAP Priority habitat deciduous woodland. These habitats would be lost and disturbed (by noise, light and dust) during construction. Vegetated shingle has a very slow recovery rate so one of its largest threats is disturbance by trampling and vehicles, which erode and degrade the vegetation and damage the natural shingle ridge patterns. Pipeline to reservoir passes adjacent to BAP Priority habitat deciduous woodland. Potential for noise, light and dust disturbance during construction. Pipeline crosses the Royal Military Canal via a road bridge. Potential for disturbance to this habitat. Ecological surveys required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

		High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	High					
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?									A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-2	-1	The option requires abstraction trenches / beach wells, a new desalination plant near Hythe, 5.56km of pipeline from the desalination plant to Saltwood Reservoir. The pipeline will not be visible during operation phase however the desalination plant will remain visible. Approximately 500m of the pipeline will be located in the Kent Downs AONB. This will not be visible once re-instatement measures have been carried out although will result in significant short term temporary impacts during construction. However, it is likely that the desalination plant will affect landscape quality after mitigation measures.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	As part of project level planning work, opportunities should be sought to enhance the landscape (e.g. through planting, location of buildings and material choice).	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There are unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-1	Construction and operation activities are likely to increase Affinity Water's carbon footprint.	-1
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option provides a 6.5Ml/d storage capacity	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	Construction and operation activities should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline is not likely to have permanent adverse affects.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses several river channels whose hydromorphology could potentially be impacted.	
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High	Hydrogeological survey and monitoring of groundwater levels in the groundwater body to assess impacts of reinjection and abstraction trench. Use of trigger levels.	-1	-2	Potential for negative impact during construction of trenches / beach wells, a new desalination plant and 5.56 km of pipeline (although short term during construction and reversible) and operation. Abstraction and reinjection during operations would be carefully monitored to understand impact on the Romney Marshes Gravels aquifer.	-2

		Low	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	High					
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?									Best construction practice and groundwater monitoring to assess impacts of injection/abstraction on groundwater quality.	-1	-2	Potential for negative impact during construction of trenches/beach wells (although short term during construction and reversible). Potential for negative impacts to water quality caused by injection of treated effluent and abstraction close to sea water interface.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Low	N/A	Long term >25 years	N/A	Temporary	Regional	Moderate	Hydrogeological survey and monitoring of groundwater levels in the Chalk.	0	-1	Potential effect on surface water where groundwater in the gravels contributes to surface water in Romney Marsh.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Heritage impact assessment should be carried out to determine the effect of the pipeline on designated heritage assets.	-2	-1	The new pipeline route crosses over the Royal Military Canal Scheduled Monument as well as passes within 10m of a further Scheduled Monument and a Listed Building. There is therefore potential for negative effects during the construction phase. However, burial of the pipeline and appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase. The new STW and WTW infrastructure may be visible from the Dymchurch Redoubt Scheduled Monument so there is the potential for negative effects during construction and operation. Mitigation measures such as screening/planting could reduce the residual effect during operational phase; however, this is uncertain at this stage and further assessments are required.	-1
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include full re-instatement of any land or soil affected by construction.	-1	0	The pipeline route crosses an area of grade 2 agricultural land. Therefore short term negative effects are expected resulting from loss of top soil during construction phase. However, appropriate re-instatement and mitigation measures should result in this effect being temporary.	0

6. Desalination options

6.1 DES

6.1.1.1 AFF-DES-WRZ7-0008

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op							Worst	
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The pipeline route crosses several major roads and therefore the option will result in minor operation phase effects on the strategic transport infrastructure. Trench and associated pipeline is within BAP priority habitat coastal vegetated shingle and BAP priority habitat deciduous woodland. Consequently there will be moderate negative construction phase effects on biodiversity. Assuming a CEMP is in place and appropriate compensatory habitat is planted the construction phase effect will be neutral. Approximately 500m of the pipeline will be located in the Kent Downs AONB. This will not be visible once re-instatement measures have been carried out although will result in a moderate negative construction phase effects. However, it is likely that the desalination plant will have a minor negative effect on landscape quality after mitigation measures. Construction and operation activities are likely to increase Affinity Water's carbon footprint and will therefore have moderate negative effects in this regard. There may also be moderate negative operational phase effects with regards to the water table and risk of saline intrusion., as well as river channel hydromorphology and the resilience of the local environment to climate change. The new pipeline route crosses the Royal Military Canal Scheduled Monument and passes within 10m of a further Scheduled Monument and a Listed Building. There is therefore potential for moderate negative effects during the construction phase. However, appropriate reinstatement should ensure that negative effects are not experienced during the operational phase.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5MI/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	Construction and operation activities are likely to increase Affinity Water's carbon footprint and will therefore have moderate negative effects in this regard. There may also be moderate negative operational phase effects with regards to the water table and risk of saline intrusion., as well as river channel hydromorphology and the resilience of the local environment to climate change. The new pipeline route crosses the Royal Military Canal Scheduled Monument and passes within 10m of a further Scheduled Monument and a Listed Building. There is therefore potential for moderate negative effects during the construction phase. However, appropriate reinstatement should ensure that negative effects are not experienced during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	The new pipeline route crosses the Royal Military Canal Scheduled Monument and passes within 10m of a further Scheduled Monument and a Listed Building. There is therefore potential for moderate negative effects during the construction phase. However, appropriate reinstatement should ensure that negative effects are not experienced during the operational phase.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	The construction traffic impact is not anticipated to be a significant impact or last longer than a few months at any one section/site. No significant impacts are anticipated during operation. Well used roads will be affected by the scheme: A259 3.2 (km), A261 0.2, Unclassified 1.6.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Low	N/A	-1	0	The option requires abstraction trenches / beach wells, a new desalination plant near Hythe, 5.56km of pipeline from the desalination plant to Saltwood Reservoir.	0	

	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	High	N/A	Long term >25 years	N/A	Permanent	N/A	National	High	Potential effect on Dungeness, Romney Marsh and Rye potential SPA, Dungeness, Romney Marsh and Rye Bay SPA and Ramsar, and Dungeness SAC. Investigations required, including ecology and hydrology. Due to proximity of the scheme to Folkestone and Etchinghill Escarpment SAC located adjacent to the M20, there is potential for increased traffic flows from the scheme to result in increases in atmospheric pollution deposition on the SAC. Traffic modelling and potential subsequent air quality modelling required to support Habitat Regulations Assessment.	-1	0	Trench and pipeline are 233m from Dungeness, Romney Marsh and Rye potential SPA, 7.1km from Dungeness, Romney Marsh and Rye Bay SPA and Ramsar site, and Dungeness SAC. Habitat Regulations assessment investigations may be required to ensure no likely significant effects result. The site is approximately 3.5km from Folkestone and Etchinghill Escarpment SAC which is located on the M20. Due to proximity of the scheme to Folkestone and Etchinghill Escarpment SAC located adjacent to the M20, there is potential for increased traffic flows from the scheme to result in increases in atmospheric pollution deposition on the SAC. Traffic modelling and potential subsequent air quality modelling required to support Habitat Regulations Assessment.	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No mitigation required.	0	0	Pipeline passes 270m from Lympe Escarpment SSSI. However as this SSSI is an escarpment no effect is anticipated.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Low	Avoid loss of BAP priority habitat if possible. If not possible, compensatory habitat may be required. CEMP should be in place during construction.	-2	0	Trench and associated pipeline is within BAP priority habitat coastal vegetated shingle and BAP priority habitat deciduous woodland. These habitats would be lost and disturbed (by noise, light and dust) during construction. Vegetated shingle has a very slow recovery rate so one of its largest threats is disturbance by trampling and vehicles, which erode and degrade the vegetation and damage the natural shingle ridge patterns. Pipeline to reservoir passes adjacent to BAP priority habitat deciduous woodland. Potential for noise, light and dust disturbance during construction. Pipeline crosses the Royal Military Canal via a road bridge. Potential for disturbance to this habitat. Ecological surveys required.	?
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	High	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-2	-1	The option requires abstraction trenches / beach wells, a new desalination plant near Hythe, 5.56km of pipeline from the desalination plant to Saltwood Reservoir. The pipeline will not be visible during operation phase however the desalination plant will remain visible. Approximately 500m of the pipeline will be located in the Kent Downs AONB. This will not be visible once re-instatement measures have been carried out although will result in significant short term temporary impacts during construction. However, it is likely that the desalination plant will affect landscape quality after mitigation measures.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There are unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-2	Construction and operation activities are likely to increase Affinity Water's carbon footprint.	-2
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	2	2	Predicted climatic changes in England include hotter and drier summers. This option provides a 6.5Ml/d storage capacity	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	?	Design and construction methods should follow sustainable design principles.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline is not likely to have permanent adverse affects.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses river channels whose hydromorphology could potentially be impacted.	-2
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

	10.c. Alter water table levels and amount of water within aquifers?	Low	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	High	Use of best construction practice. Hydrogeological survey and monitoring of groundwater levels in the Romney Marsh groundwater body to confirm groundwater flow and impacts. Implement trigger levels for any potential dewatering during construction and operation of new treatment works and abstractions from new trench/wells.	-1	-2	Potential for negative impact effect during construction of new abstraction well (although very short term during construction and reversible) and operation. Abstraction during operations would be carefully monitored to understand impact on water levels in the Romney Marshes groundwater body.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	High	Best Construction practice. Hydrogeological survey should include assessment of groundwater quality to consider impact of abstraction on water quality and saline intrusion	-1	-2	Potential for negative impact effect during construction of new abstraction well (although very short term during construction and reversible) and operation close to groundwater/sea water interface. Abstraction during operations would be carefully monitored to understand impact on water quality in the Romney Marshes groundwater body.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	Low	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	High	Hydrogeological survey to confirm groundwater interaction with surface water and monitoring of groundwater levels in the groundwater body.	-1	-1	Potential effect on surface water where contribution from the Romney Marshes Groundwater body contributes to surface water flows in the marshes.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Heritage impact assessment should be carried out to determine the effect of the pipeline on designated heritage assets.	-2	0	The new pipeline route crosses the Royal Military Canal Scheduled Monument and passes within 10m of a further Scheduled Monument and a Listed Building. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No grade 1 or 2 agricultural land will be affected by this option.	0

6.1.1.2 AFF-DES-WRZ7-0309

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		Worst
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The pipeline route crosses several major roads and therefore the option will result in minor negative operation phase effects on the strategic transport infrastructure and public rights of way. There may also be minor negative effects on biodiversity as the pipeline crosses marsh habitat which may link to the nearby Romney Marsh and Rye SPA, Ramsar and Dungeness SAC. The pipeline also passes adjacent to BAP priority habitat deciduous woodland and vegetated shingle. There will be moderate negative construction phase and minor negative operational effects on Landscape because approximately 500m of the pipeline will be located in the Kent Downs AONB. This will not be visible once re-instatement measures have been carried out although will result in significant short term temporary impacts during construction. However, it is likely that the desalination plant will affect landscape quality after mitigation measures. Construction and operation activities are likely to increase Affinity Water's carbon footprint and there will be moderate negative effects in regard to this during both construction and operation. The option is also likely to have operational phase effects on the river channel hydromorphology and the resilience of the local environment to climate change.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionately affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option requires 11.8km of pipeline from the desalination plant to Saltwood Reservoir. A new pipeline of this length is likely to sever sections of public rights of way and other amenity assets. This has the potential for a temporary short term minor negative effect.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Low	N/A	Long term >25 years	N/A	Temporary	N/A	Local	Low	N/A	-1	0	The pipeline route follows the A259 for some sections and also crosses the Romney, Hythe and Dymchurch Railway line the remainder of the route follows smaller B roads. It is considered that construction works may have a short term minor negative effect on this infrastructure.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Low	N/A	-2	0	The option requires sea intake pipes, a new desalination plant near Hythe, 11.8km of pipeline from the desalination plant to Saltwood Reservoir.	-2	
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	Low	N/A	Medium term (5-25 years)	N/A	Temporary	N/A	National	Low	HRA and in combinations assessment likely to be required.	-1	0	Pipeline passes 270m from Lymgne Escarpment SSSI. However as this SSSI is an escarpment no effect is anticipated. Proposed desalination plant is 2.9km from the recommended MCZ at Hythe Bay. Pipeline and water treatment works are 205m from Dungeness, Romney Marsh & Rye potential SPA, 1.8km from Dungeness, Romney Marsh and Rye Bay SPA and Ramsar site, and 3.2km from Dungeness SAC. Potential for disturbance (noise, light, dust etc.) during construction. Pipeline also crosses marsh habitat with ditches, which may link to the SPA, Ramsar and SAC. Investigation may be required into the effect on these designated sites.	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	?	?	?	?	Temporary	Permanent	Regional	High	Pipeline passes 270m from Lymgne Escarpment SSSI. However as this SSSI is an escarpment no effect is anticipated. Pipeline and water treatment works are 1.8km from Sugeness, Romney Marsh and Rye Bay SSSI. Ecological surveys required.	0	0	Pipeline passes 270m from Lymgne Escarpment SSSI. However as this SSSI is an escarpment no effect is anticipated. Pipeline and water treatment works are 1.8km from Sugeness, Romney Marsh and Rye Bay SSSI. Ecological surveys required.	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	Low	N/A	Medium term (5-25 years)	N/A	Temporary	N/A	Local	Low	CEMP should be in place during construction to reduce potential for disturbance to priority habitats. Although not a BAP priority habitat - pipeline crosses areas of marsh and ditches that may be sensitive to changes in hydrology and support protected species. Reduce loss of this habitat where possible. Ecological surveys will be required.	-1	0	Pipeline to reservoir passes adjacent to BAP priority habitat deciduous woodland and vegetated shingle. Potential for noise, light and dust disturbance during construction. Pipeline crosses the Royal Military Canal via a road bridge. Potential for disturbance to this habitat. Pipeline crosses area of marsh with associated waterbodies. Potential for loss of and disturbance to these habitats. Potential for hydrological changes depending on the depth of the pipeline.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	High	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-2	-1	The option requires sea intake pipes, a new desalination plant near Hythe, 11.8km of pipeline from the desalination plant to Saltwood Reservoir. The pipeline will not be visible during operation phase however the desalination plant will remain visible. Approximately 500m of the pipeline will be located in the Kent Downs AONB. This will not be visible once re-instatement measures have been carried out although will result in significant short term temporary impacts during construction. However, it is likely that the desalination plant will affect landscape quality after mitigation measures.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-2	-2	Construction and operation activities are likely to increase Affinity Water's carbon footprint.	-2
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	1	Predicted climatic changes in England include 1.5Ml/d storage capacity	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	?	Design and construction methods should follow sustainable design principles.	0	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline is not likely to have permanent adverse affects.	-1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses river channels whose hydromorphology could potentially be impacted.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0		
	10.c. Alter water table levels and amount of water within aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Best construction practice and monitoring for nearby abstractions if dewatering is required during construction works	-1	0	Potential for negative impact effect during construction (although very short term during construction and reversible) .	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Best construction practice if dewatering is required during construction works	0	0	Potential for negative impact effect during construction but appropriate mitigation should ensure residual effects are neutral.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	Best construction practice and monitoring for nearby abstractions if dewatering is required during construction works	-1	0	Potential effect on surface water where groundwater contributes to surface water although impacts are likely to be very short term and reversible.	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Heritage impact assessment should be carried out to determine the effect of the pipeline on designated heritage assets.	-2	0	The new pipeline route crosses the Royal Military Canal Scheduled Monument and passes within 10m of a further Scheduled Monument and a Listed Building. There is therefore potential for negative effects during the construction phase. However, appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase.	0
	13. b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Mitigation measures should include reinstatement of land	-2	0	Approximately 7km of the pipeline route is located within grade 2 agricultural land. There will be short term temporary negative effects on this agricultural land during construction. Assuming appropriate reinstatement, the residual effect during construction should be neutral.	0

6.1.1.3 AFF-DES-WRZ7-0396

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The pipeline route crosses several major roads and therefore the option will result in minor negative operation phase effects on the strategic transport infrastructure and public rights of way. Trench and associated pipeline is within BAP Priority habitat coastal vegetated shingle and BAP Priority habitat deciduous woodland. Consequently there will be moderate negative construction effects in this regard. Assuming avoidance, or compensation with a CEMP in place the operation phase effect should be neutral. There will be moderate negative construction phase and minor negative operational effects on Landscape because approximately 500m of the pipeline will be located in the Kent Downs AONB. This will not be visible once re-instatement measures have been carried out although will result in significant short term temporary impacts	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2M/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	N/A	-1	0	The option requires 5.56km of pipeline from the desalination plant to Saltwood Reservoir. A new pipeline of this length is likely to sever sections of public rights of way and other amenity assets. This has the potential for a temporary short term minor negative effect.	

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	during construction. However, it is likely that the desalination plant will affect landscape quality after mitigation measures. The option has the potential to have moderate negative operational phase effects on both water level and water quality in the Romney Marshes groundwater body. It may also have minor negative effects on surface water bodies. There will be moderate negative construction phase and minor negative operational effects on Landscape because approximately 500m of the pipeline will be located in the Kent Downs AONB. This will not be visible once re-instatement measures have been carried out although will result in significant short term temporary impacts during construction. However, it is likely that the desalination plant will affect landscape quality after mitigation measures.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	the pipeline route follows the A259 for some sections, the remainder of the route follows smaller B roads. It is anticipated that construction will take longer than a few months, but that traffic impacts will not last the full duration of construction (due to anticipated concentration of deliveries at key stages of construction).	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		High	High	Long term >25 years	Long term >25 years	Permanent	Permanent	Local	Low	N/A	-2	0	The option requires abstraction trenches / beach wells, a new desalination plant near Hythe, 5.56km of pipeline from the desalination plant to Saltwood Reservoir.	-2
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		High	N/A	Long term >25 years	N/A	Permanent	N/A	National	Low	Potential effect on Dungeness, Romney Marsh and Rye potential SPA, Dungeness, Romney Marsh and Rye Bay SPA and Ramsar, and Dungeness SAC. Investigations required, including ecology and hydrology. Due to proximity of the scheme to Folkestone and Etchinghill Escarpment SAC located adjacent to the M20, there is potential for increased traffic flows from the scheme to result in increases in atmospheric pollution deposition on the SAC. Traffic modelling and potential subsequent air quality modelling required to support Habitat Regulations Assessment.	-1	0	Trench and pipeline are 233m from Dungeness, Romney Marsh and Rye potential SPA, 7.1km from Dungeness, Romney Marsh and Rye Bay SPA and Ramsar site, and Dungeness SAC. Habitat Regulations assessment investigations may be required to ensure no likely significant effects result. The site is approximately 3.5km from Folkestone and Etchinghill Escarpment SAC which is located on the M20. Due to proximity of the scheme to Folkestone and Etchinghill Escarpment SAC located adjacent to the M20, there is potential for increased traffic flows from the scheme to result in increases in atmospheric pollution deposition on the SAC. Traffic modelling and potential subsequent air quality modelling required to support Habitat Regulations Assessment.	?
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		?	?	?	?	?	?	?	?	Potential effect on SSSI associated with Sungeness, Romney Marsh and Rye Bay SPA and Dungeness SAC. Investigations required, including ecology and hydrology.	0	0	Pipeline passes 270m from Lympne Escarpment SSSI and 2.2km from Folkestone to Etchinghill Escarpment SSSI. However as these SSSIs are escarpments no effect is anticipated. Trench and pipeline are 7.1km from the SSSI associated with Dungeness, Romney Marsh and Rye Bay SPA and Ramsar site, and Dungeness SAC. Investigations required, including ecology and hydrology.	

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	High	N/A	Long term >25 years	N/A	Permanent	N/A	Local	Low	Avoid loss of BAP Priority habitat if possible. If not possible, compensatory habitat may be required. CEMP should be in place during construction.	-2	0	Trench and associated pipeline is within BAP Priority habitat coastal vegetated shingle and BAP Priority habitat deciduous woodland. These habitats would be lost and disturbed (by noise, light and dust) during construction. Vegetated shingle has a very slow recovery rate so one of its largest threats is disturbance by trampling and vehicles, which erode and degrade the vegetation and damage the natural shingle ridge patterns. Pipeline to reservoir passes adjacent to BAP Priority habitat deciduous woodland. Potential for noise, light and dust disturbance during construction. Pipeline crosses the Royal Military Canal via a road bridge. Potential for disturbance to this habitat. Ecological surveys required.	
	5.c. Impact on non-native species?	?	?	?	?	?	?	?	?	No invasive species identified, however detailed ecological survey required.	?	?	No invasive species identified, however detailed ecological survey required.	
	5.e. Provide opportunities for biodiversity enhancement?	?	?	?	?	?	?	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	?	?	Potential for enhancements such as green walls/ roofs, planting of native wildflower meadow/ pollinator meadows, or other biodiversity benefiting planting scheme.	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	High	High	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	High	A landscape impact assessment may be required to determine the sensitivity of the receiving landscape and potential effects of the option as well as appropriate mitigation measures.	-2	-1	The option requires abstraction trenches / beach wells, a new desalination plant near Hythe, 5.56km of pipeline from the desalination plant to Saltwood Reservoir. The pipeline will not be visible during operation phase however the desalination plant will remain visible. Approximately 500m of the pipeline will be located in the Kent Downs AONB. This will not be visible once re-instatement measures have been carried out although will result in significant short term temporary impacts during construction. However, it is likely that the desalination plant will affect landscape quality after mitigation measures.	-1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	There is the potential for minor negative effects during construction but these are unlikely to be significant given that the route does not pass through any AQMAs. There are unlikely to be any significant impacts on local air quality during operation.	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Long term >25 years	Permanent	Permanent	National	Moderate	Design and construction methods should follow sustainable design principles.	-1	-1	Construction and operation activities are likely to increase Affinity Water's carbon footprint.	-1
	8.b. Maximise the company's resilience to a changing climate?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	Local	?	Design and construction methods should follow sustainable design principles.	0	2	Predicted climatic changes in England include hotter and drier summers. This option provides a 6.5MI/d storage capacity	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	Medium	Medium	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	?	Design and construction methods should follow sustainable design principles.	-1	-1	Further abstraction may have a negative effect on the environment if not properly monitored and licensed, the pipeline is not likely to have permanent adverse affects.	-1

10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	Low	Low	Short term (< 5 years)	Long term >25 years	Temporary	Permanent	Local	Low	Best construction practice.	-1	-1	The pipeline crosses river channels whose hydromorphology could potentially be impacted.	-2
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	10.c. Alter water table levels and amount of water within aquifers?	Low	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	High	Use of best construction practice. Hydrogeological survey and monitoring of groundwater levels in the Romney Marsh groundwater body to confirm groundwater flow and impacts. Imply trigger levels for any potential dewatering during construction and operation of new treatment works and abstractions from new trench/wells.	-1	-2	Potential for negative impact effect during construction of new abstraction well (although very short term during construction and reversible) and operation close to groundwater/sea water interface. Abstraction during operations would be carefully monitored to understand impact on water levels in the Romney Marshes groundwater body.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	Low	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	High	Best Construction practice. Hydrogeological survey should include assessment of groundwater quality to consider impact of abstraction on water quality and saline intrusion.	-1	-2	Potential for negative impact effect during construction of new abstraction well (although very short term during construction and reversible) and operation. Abstraction during operations would be carefully monitored to understand impact on water quality in the Romney Marshes groundwater body.	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	Low	Low	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	High	Hydrogeological survey to confirm groundwater interaction with surface water and monitoring of groundwater levels in the groundwater body.	-1	-1	Potential effect on surface water where contribution from the Romney Marshes groundwater body contributes to surface water flows in the marshes.	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option will not lead to loss of floodplain or significantly increase surface water run off.	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	High	Heritage impact assessment should be carried out to determine the effect of the pipeline on designated heritage assets.	-2	-1	The new pipeline route crosses over the Royal Military Canal Scheduled Monument as well as passes within 10m of a further Scheduled Monument and a Listed Building. There is therefore potential for negative effects during the construction phase. However, burial of the pipeline and appropriate reinstatement of any land affected should ensure that negative effects are in the short-term, temporary and not experienced during the operational phase. The new desalination plant may be visible from the Dymchurch Redoubt Scheduled Monument so there is the potential for negative effects during construction and operation. Mitigation measures such as screening/planting could reduce the residual effect during operational phase; however, this is uncertain at this stage and further assessments are required.	-1
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mitigation measures should include a full archaeological survey where further excavation work outside of current pipe lines is required.	0	0	At this stage it is not considered likely that any water dependant heritage assets would be significantly affected.	

14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	No grade 1 or 2 agricultural land will be affected by this option.	0								
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7. Demand

7.1.1.1 WEFF901

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option involves a comprehensive household water audit and retrofit. No impact on health or hygiene is anticipated but some people will incur disruption from audit visit. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Water efficient devices should held to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option involves a comprehensive household water audit and retrofit. No impact on health or hygiene is anticipated but some people will incur disruption from audit visit.	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No - option requires new Water Efficient devises. These are not expected to involve significant construction.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Minimal waste associated with this option, in the form of meter packaging.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Delivery of the service entails travel to participating properties which will generate some emission. Careful operation of scheme can minimise these.	0	

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However there is a medium term carbon saving associated with the reduced water requirement.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will contribute to Affinity's resilience to a changing climate.	1
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand and therefore lowered abstraction. This will have a positive effects on the local environment and affinity assets with regards to climate change adaptation.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will protect water levels.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will protect water levels.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.2 WEFF569

SEA Objective	Assessment questions (would the	Impact Description	Likelihood of effect, taking into account	Scale of	Sensitivity	Mitigation proposals	Residual	Effect Description
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	options / programme...?)		Probability		Duration		Permanence		impact	of the receptor		effect		Worst case operational effect					
			Con	Op	Con	Op	Con	Op				Con	Opp						
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option would involve installation of water efficient devices and householders encouraged to change water-use behaviour by provision of water efficiency information. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Water efficient devices should held to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option would involve installation of water efficient devices and householders encouraged to change water-use behaviour by provision of water efficiency information. No impact on health or hygiene is anticipated but some people will incur disruption from installation.	0				
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		This option would involve installation of water efficient devices and householders encouraged to change water-use behaviour by provision of water efficiency information. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Water efficient devices should held to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0			
	2.b. Alter water levels that affect water-based recreation assets?			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?			This option would involve installation of water efficient devices and householders encouraged to change water-use behaviour by provision of water efficiency information. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Water efficient devices should held to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0		
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?				This option would involve installation of water efficient devices and householders encouraged to change water-use behaviour by provision of water efficiency information. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Water efficient devices should held to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No - option requires new Water Efficient devices. These are not expected to involve significant construction.	0	
	4.b. Result in higher levels of reuse of waste?					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	This option would involve installation of water efficient devices and householders encouraged to change water-use behaviour by provision of water efficiency information. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Water efficient devices should held to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	5.c. Impact on non-native species?					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	5.e. Provide opportunities for biodiversity enhancement?		N/A			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		This option would involve installation of water efficient devices and householders encouraged to change water-use behaviour by provision of water efficiency information. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Water efficient devices should held to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?			N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?			This option would involve installation of water efficient devices and householders encouraged to change water-use behaviour by provision of water efficiency information. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Water efficient devices should held to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Delivery of the service entails travel to participating properties which will generate some emission. Careful operation of scheme can minimise these.	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?				Medium	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However there is a medium term carbon saving associated with the reduced water requirement.	1		

	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will contribute to Affinity's resilience to a changing climate.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand and therefore lowered abstraction. This will have a positive effects on the local environment and affinity assets with regards to climate change adaptation.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will protect water levels.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will protect water levels.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.3 WEFF1000

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	An analysis of business and water use would be undertaken. This option initially proposes provision of cistern displacement device or dual flush retrofit devices and taps	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option would involve installation of water efficient devices and businesses encouraged to change water-use behaviour by provision of water	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			

	1.c. Enable the growth ambitions of the study area to be realised?	inserts and provision of water use saving information for businesses. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Water efficient devices should held to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	efficiency information. No impact on health or hygiene is anticipated but some people will incur disruption from audit visit which	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c.. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No - option requires new Water Efficient devises. These are not expected to involve Signiant construction	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Minimal waste associated with this option.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.c. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.e. Provide opportunities for biodiversity enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	6.b. Provide opportunities for landscape enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Delivery of the service entails travel to participating properties which will generate some emission. Careful operation of scheme can minimise these.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?		Medium	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However there is a medium term carbon saving associated with the reduced water requirement.	1
	8.b. Maximise the company's resilience to a changing climate?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will contribute to Affinity's resilience to a changing climate.	

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand and therefore lowered abstraction. This will have a positive effects on the local environment and affinity assets with regards to climate change adaptation.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will protect water levels.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will protect water levels.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.4 WEFF567

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option proposes to target one town/community per year with behavioural change methods to enhance a specific river/and or sustainability reductions. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement as a	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option is proposed to target one town/community per year with behavioural change methods to enhance a specific river/and or sustainability reductions. No impact on health or hygiene is anticipated but some people will incur disruption from visit.	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	

	2.b. Alter water levels that affect water-based recreation assets?	result of behavioural change. Behavioural change could help to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.c.. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Minimal waste associated with this option.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.c. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Delivery of the service entails travel to participating properties which will generate some emission. Careful operation of scheme can minimise these.	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	N/A	-1	1	Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However there is a medium term carbon saving associated with the reduced water requirement.	1	
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	N/A	0	1	Behavioural changes should help to reduce water usage during operational phase, and could contribute to a lowered water demand. This will contribute to Affinity's resilience to a changing climate.		
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	N/A	0	1	Behavioural changes should help to reduce water usage during operational phase, and could contribute to a lowered water demand and therefore lowered abstraction. This will have a positive effects on the local environment and affinity assets with regards to climate change adaptation.	1	
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		

	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Behavioural changes should reduce water usage during operational phase, and could contribute to a lowered water demand. This will protect water levels.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Behavioural changes should reduce water usage during operational phase, and could contribute to a lowered water demand. This will protect water levels.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.5 MET904

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option involves a comprehensive household water audit and retrofit. No impact on health or hygiene is anticipated but some people will incur disruption from audit visit. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Water efficient devices should be held to reduce water usage during operational phase, and therefore contribute to a lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option involves a comprehensive household water audit and retrofit. No impact on health or hygiene is anticipated but some people will incur disruption from audit visit.	0	
	1.b. Ensure that customers are not disproportionately affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No - option requires new Water Efficient devices. These are not expected to involve significant construction.	0

	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Minimal waste associated with this option, in the form of meter packaging.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Delivery of the service entails travel to participating properties which will generate some emission. Careful operation of scheme can minimise these.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However there is a medium term carbon saving associated with the reduced water requirement.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will contribute to Affinity's resilience to a changing climate.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand and therefore lowered abstraction. This will have a positive effects on the local environment and affinity assets with regards to climate change adaptation.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will protect water levels.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Water efficient devices should reduce water usage during operational phase, and should contribute to a lowered water demand. This will protect water levels.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.6 MET1002

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operation effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option involves conversion of AMR drive by to a fixed network. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Metering could reduce water usage during operational phase, and therefore lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option involves a fixed network of compulsory metering. There will be disturbance for customers with internal meters. There will be no disturbance for meters will be installed in boundary boxes already in pavement in front of properties. Some people will save money through metered bills; others may pay more.	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c.. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Minimal waste associated with this option.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		

	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Delivery of the service entails travel to participating properties which will generate some emission. Careful operation of scheme can minimise these.	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	2	Delivery of the service entails travel to participating properties which will generate some emissions associated with installation and embodied carbon footprint of meters and boundary boxes. Careful operation of scheme can minimise these. However there is a medium term carbon saving associated with the reduced water requirement. Furthermore, reduced carbon emissions during operational phase due to meters being read remotely.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should reduce water usage during operational phase, and could contribute to a lowered water demand. This will contribute to Affinity's resilience to a changing climate.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during operational phase, and could contribute to a lowered water demand and therefore lowered abstraction. This will have a positive effects on the local environment and affinity assets with regards to climate change adaptation.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during the operational phase, and could contribute to a lower water demand. This will protect water levels.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during the operational phase, and could contribute to a lower water demand. This will protect water levels.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.7 MET186

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option would involve Affinity Water changing its policy to enforce the installation of meters when unmetered properties change ownership using existing powers under the Water Industry Act 1991. This option could be applied in a targeted manner if appropriate. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Metering could reduce water usage during operational phase, and therefore lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option involves a fixed network of compulsory metering. There will be disturbance for customers with internal meters. There will be no disturbance for meters will be installed in boundary boxes already in pavement in front of properties. Some people will save money through metered bills; others may pay more.	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Minimal waste associated with this option.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		

	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Delivery of the service entails travel to participating properties which will generate some emission. Careful operation of scheme can minimise these.	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	2	Delivery of the service entails travel to participating properties which will generate some emissions associated with installation and embodied carbon footprint of meters and boundary boxes. Careful operation of scheme can minimise these. However there is a medium term carbon saving associated with the reduced water requirement.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should reduce water usage during operational phase, and could contribute to a lowered water demand. This will contribute to Affinity's resilience to a changing climate.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during operational phase, and could contribute to a lowered water demand and therefore lowered abstraction. This will have a positive effects on the local environment and affinity assets with regards to climate change adaptation.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during the operational phase, and could contribute to a lower water demand. This will protect water levels.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during the operational phase, and could contribute to a lower water demand. This will protect water levels.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A	0								
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0								

7.1.1.8 MET531

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option is to enforce existing powers and to install meters for 8,500 of unmeasured non-household properties in the supply area. This option could be applied in a targeted manner if appropriate. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Metering could reduce water usage during operational phase, and therefore lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option involves a fixed network of compulsory metering. There will be disturbance for customers with internal meters. There will be no disturbance for meters will be installed in boundary boxes already in pavement in front of properties. Some people will save money through metered bills; others may pay more.	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Minimal waste associated with this option.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0				
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0				
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0				
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0				
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0				

7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Delivery of the service entails travel to participating properties which will generate some emission. Careful operation of scheme can minimise these.	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	Medium	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	2	Delivery of the service entails travel to participating properties which will generate some emissions associated with installation and embodied carbon footprint of meters and boundary boxes. Careful operation of scheme can minimise these. However there is a medium term carbon saving associated with the reduced water requirement.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should reduce water usage during operational phase, and could contribute to a lowered water demand. This will contribute to Affinity's resilience to a changing climate.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during operational phase, and could contribute to a lowered water demand and therefore lowered abstraction. This will have a positive effects on the local environment and affinity assets with regards to climate change adaptation.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during the operational phase, and could contribute to a lower water demand. This will protect water levels.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during the operational phase, and could contribute to a lower water demand. This will protect water levels.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.9 MET1010

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option involves a fixed network of metering in WRZ4 and WRZ6. Delivery of the service entails travel to participating properties which will generate some emissions. Careful operation of scheme can minimise these. However, there is a medium term carbon saving associated with the reduced water requirement. Metering could reduce water usage during operational phase, and therefore lower water demand. This could result in an overall positive operational effect for objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	This option involves a fixed network of metering in WRZ4 and WRZ6. There will be disturbance for customers with internal meters. There will be no disturbance for meters will be installed in boundary boxes already in pavement in front of properties. Some people will save money through metered bills; others may pay more.	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	5.c. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	5.e. Provide opportunities for biodiversity enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Delivery of the service entails travel to participating properties which will generate some emission. Careful operation of scheme can minimise these.	0	

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?		Medium	Medium	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	2	Delivery of the service entails travel to participating properties which will generate some emissions associated with installation and embodied carbon footprint of meters and boundary boxes. Careful operation of scheme can minimise these. However there is a medium term carbon saving associated with the reduced water requirement.	1
	8.b. Maximise the company's resilience to a changing climate?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should reduce water usage during operational phase, and could contribute to a lowered water demand. This will contribute to Affinity's resilience to a changing climate.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during operational phase, and could contribute to a lowered water demand and therefore lowered abstraction. This will have a positive effects on the local environment and affinity assets with regards to climate change adaptation.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during the operational phase, and could contribute to a lower water demand. This will protect water levels.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	N/A	Moderate	N/A	0	1	Metering should help to reduce water usage during the operational phase, and could contribute to a lower water demand. This will protect water levels.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.10 REUSE620

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect			
			Probability		Duration		Permanence					Con	Opp					
			Con	Op	Con	Op	Con	Op										
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option involves the implementation of a rainwater harvesting system in Luton Airport Terminal and Hangar Buildings. It would require Installation of free standing rainwater tanks at optimal collection points across Luton site. However a further study is required to establish the detailed design. The Public not be affected by tank installation or operation with no interruption to supply. The option Utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for objectives 8,9,10,11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Public not affected by tank installation or operation with no interruption to supply	0				
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		This option involves the implementation of a rainwater harvesting system in Luton Airport Terminal and Hangar Buildings. It would require Installation of free standing rainwater tanks at optimal collection points across Luton site. However a further study is required to establish the detailed design. The Public not be affected by tank installation or operation with no interruption to supply. The option Utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for objectives 8,9,10,11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0			
	2.b. Alter water levels that affect water-based recreation assets?			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?			This option involves the implementation of a rainwater harvesting system in Luton Airport Terminal and Hangar Buildings. It would require Installation of free standing rainwater tanks at optimal collection points across Luton site. However a further study is required to establish the detailed design. The Public not be affected by tank installation or operation with no interruption to supply. The option Utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for objectives 8,9,10,11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0		
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?				This option involves the implementation of a rainwater harvesting system in Luton Airport Terminal and Hangar Buildings. It would require Installation of free standing rainwater tanks at optimal collection points across Luton site. However a further study is required to establish the detailed design. The Public not be affected by tank installation or operation with no interruption to supply. The option Utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for objectives 8,9,10,11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option requires installation of polyethylene rainwater tanks - not considered to be a significant effect.	0	
	4.b. Result in higher levels of reuse of waste?					N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		Rather than waiting for rainwater to enter catchment water resources and then require treatment and pumping through the mains system, the option instead utilises rainwater directly at the source. This should result in a reduced material consumption and generation of waste.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?					This option involves the implementation of a rainwater harvesting system in Luton Airport Terminal and Hangar Buildings. It would require Installation of free standing rainwater tanks at optimal collection points across Luton site. However a further study is required to establish the detailed design. The Public not be affected by tank installation or operation with no interruption to supply. The option Utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for objectives 8,9,10,11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.c. Impact on non-native species?	N/A					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A				N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	This option involves the implementation of a rainwater harvesting system in Luton Airport Terminal and Hangar Buildings. It would require Installation of free standing rainwater tanks at optimal collection points across Luton site. However a further study is required to establish the detailed design. The Public not be affected by tank installation or operation with no interruption to supply. The option Utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for objectives 8,9,10,11.	N/A				N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?		N/A				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		N/A
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		This option involves the implementation of a rainwater harvesting system in Luton Airport Terminal and Hangar Buildings. It would require Installation of free standing rainwater tanks at optimal collection points across Luton site. However a further study is required to establish the detailed design. The Public not be affected by tank installation or operation with no interruption to supply. The option Utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for objectives 8,9,10,11.	N/A			N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	There will be embodied carbon in a polyethylene rainwater tank and operational carbon. However, Carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in significant carbon savings.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	1
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.11 REUSE621

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option involves surface water reuse (Luton Airport). It will make use of water coming from run-off and will be collected into central drainage pipework, then reaccepted in a contact tank, then treated via Reed Beds Filter and finally stored in a tank. This water would be used for non-potable usage such as toilet flushing and ground surface cleaning. Further study required to establish the scale of the project. Public not affected by capture and reticulation. The option utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for SEA objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for SEA objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Public not affected by capture and reticulation	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option requires excavation and installation of new reticulation network as earth materials can be recycled this is not considered to be a significant effect.	0
	4.b. Result in higher levels of reuse of waste?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	N/A	0	1	Rather than waiting for rainwater to enter catchment water resources and then require treatment and pumping through the mains system, the option instead utilises rainwater directly at the source. This should result in a reduced material consumption and generation of waste.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	There will be embodied carbon in the excavation and installation of new reticulation network and operational carbon. However, carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in significant carbon savings.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.12 REUSE606

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect			
			Probability		Duration		Permanence					Con	Opp					
			Con	Op	Con	Op	Con	Op										
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	Exploratory option involving water recycling within Stansted airport's facility. The recycled water would come from greywater and/or surface waters. Currently rainwater run off flows into series of onsite balancing pond. The option requires storage ponds, detention ponds, roof runoff directed to swales and surface water optimisation and capture investigation. Further study required to establish savings and detailed design. Public not affected by capture and recycling. The option utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for SEA objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for SEA objectives 8 ,9, 10, 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Public not affected by capture and recycling system.	0			
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		Exploratory option involving water recycling within Stansted airport's facility. The recycled water would come from greywater and/or surface waters. Currently rainwater run off flows into series of onsite balancing pond. The option requires storage ponds, detention ponds, roof runoff directed to swales and surface water optimisation and capture investigation. Further study required to establish savings and detailed design. Public not affected by capture and recycling. The option utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for SEA objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for SEA objectives 8 ,9, 10, 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0		
	2.b. Alter water levels that affect water-based recreation assets?			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0				
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0				
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?			Exploratory option involving water recycling within Stansted airport's facility. The recycled water would come from greywater and/or surface waters. Currently rainwater run off flows into series of onsite balancing pond. The option requires storage ponds, detention ponds, roof runoff directed to swales and surface water optimisation and capture investigation. Further study required to establish savings and detailed design. Public not affected by capture and recycling. The option utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for SEA objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for SEA objectives 8 ,9, 10, 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?				Exploratory option involving water recycling within Stansted airport's facility. The recycled water would come from greywater and/or surface waters. Currently rainwater run off flows into series of onsite balancing pond. The option requires storage ponds, detention ponds, roof runoff directed to swales and surface water optimisation and capture investigation. Further study required to establish savings and detailed design. Public not affected by capture and recycling. The option utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for SEA objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for SEA objectives 8 ,9, 10, 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option requires excavation and installation of new recycling system as earth materials can be recycled this is not considered to be a significant effect.	0
	4.b. Result in higher levels of reuse of waste?					N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?					Exploratory option involving water recycling within Stansted airport's facility. The recycled water would come from greywater and/or surface waters. Currently rainwater run off flows into series of onsite balancing pond. The option requires storage ponds, detention ponds, roof runoff directed to swales and surface water optimisation and capture investigation. Further study required to establish savings and detailed design. Public not affected by capture and recycling. The option utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for SEA objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for SEA objectives 8 ,9, 10, 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	5.c. Impact on non-native species?	N/A					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A				N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	Exploratory option involving water recycling within Stansted airport's facility. The recycled water would come from greywater and/or surface waters. Currently rainwater run off flows into series of onsite balancing pond. The option requires storage ponds, detention ponds, roof runoff directed to swales and surface water optimisation and capture investigation. Further study required to establish savings and detailed design. Public not affected by capture and recycling. The option utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for SEA objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for SEA objectives 8 ,9, 10, 11.	N/A				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	6.b. Provide opportunities for landscape enhancement?		N/A				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		Exploratory option involving water recycling within Stansted airport's facility. The recycled water would come from greywater and/or surface waters. Currently rainwater run off flows into series of onsite balancing pond. The option requires storage ponds, detention ponds, roof runoff directed to swales and surface water optimisation and capture investigation. Further study required to establish savings and detailed design. Public not affected by capture and recycling. The option utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for SEA objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for SEA objectives 8 ,9, 10, 11.	N/A			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	There will be embodied carbon in the excavation and installation of new recycling system and operational carbon. However, carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in significant carbon savings.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.13 REUSE603

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This is a speculative option to fit rainwater recycling system (with dual reticulation network) in a new housing development, at a community scale. After basic disinfection, the rainwater used for toilet flushing, clothes washing and outdoor use. House prices may be higher on development to recover initial outlay cost by developer. Therefore, there is expected to be a negative effect on SEA objective 1. The option utilises rainwater, an otherwise wasted resource, and will therefore have positive effects for SEA objective 4. There will be an associated reduction in carbon output and mains water usage which corresponds to positive operational phase effects for SEA objectives 8, 9, 10 and 11.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	House prices may be higher on development to recover initial outlay cost by developer.	-1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	Medium	N/A	Long term >25 years	N/A	Temporary	Local	Moderate	N/A	0			-1
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	The option requires construction and installation of new reticulation network. However, this is not considered to be a significant effect.	0
	4.b. Result in higher levels of reuse of waste?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Rather than waiting for rainwater to enter catchment water resources and then require treatment and pumping through the mains system, the option instead utilises rainwater directly at the source. This should result in a reduced material consumption and generation of waste.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	There will be embodied carbon in construction and installation of new reticulation network. However, carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in significant carbon savings.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	1
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Utilising rainwater, an otherwise wasted resource will result in a reduction in the mains water requirement over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.14 LE637

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect		
			Probability		Duration		Permanence					Con	Opp				
			Con	Op	Con	Op	Con	Op									
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option involves leak reduction through greater ALC. Carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings. Additionally, this water saving over the operational phase will maximise both Affinity Water's and the local environment's resilience to climate change and the associated decrease in water availability. This will result in positive effects for SEA objectives 8 and 9.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0			
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A				
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A				
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		This option involves leak reduction through greater ALC. Carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings. Additionally, this water saving over the operational phase will maximise both Affinity Water's and the local environment's resilience to climate change and the associated decrease in water availability. This will result in positive effects for SEA objectives 8 and 9.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0		
	2.b. Alter water levels that affect water-based recreation assets?			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A			
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A			
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?			This option involves leak reduction through greater ALC. Carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings. Additionally, this water saving over the operational phase will maximise both Affinity Water's and the local environment's resilience to climate change and the associated decrease in water availability. This will result in positive effects for SEA objectives 8 and 9.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?				This option involves leak reduction through greater ALC. Carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings. Additionally, this water saving over the operational phase will maximise both Affinity Water's and the local environment's resilience to climate change and the associated decrease in water availability. This will result in positive effects for SEA objectives 8 and 9.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	4.b. Result in higher levels of reuse of waste?	N/A				N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	This option involves leak reduction through greater ALC. Carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings. Additionally, this water saving over the operational phase will maximise both Affinity Water's and the local environment's resilience to climate change and the associated decrease in water availability. This will result in positive effects for SEA objectives 8 and 9.				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.c. Impact on non-native species?		N/A			N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A			N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	5.e. Provide opportunities for biodiversity enhancement?		This option involves leak reduction through greater ALC. Carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings. Additionally, this water saving over the operational phase will maximise both Affinity Water's and the local environment's resilience to climate change and the associated decrease in water availability. This will result in positive effects for SEA objectives 8 and 9.			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?			N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
7. Minimise the effects of the option / plan on air quality and noise?	6.b. Provide opportunities for landscape enhancement?			This option involves leak reduction through greater ALC. Carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings. Additionally, this water saving over the operational phase will maximise both Affinity Water's and the local environment's resilience to climate change and the associated decrease in water availability. This will result in positive effects for SEA objectives 8 and 9.		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	7.a. Impact an AQMA?				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?				This option involves leak reduction through greater ALC. Carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings. Additionally, this water saving over the operational phase will maximise both Affinity Water's and the local environment's resilience to climate change and the associated decrease in water availability. This will result in positive effects for SEA objectives 8 and 9.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings.

	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This will maximise the company's resilience to climate change and the associated decrease in water availability.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.15 LE423

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option requires installation of new PRVs to attain leakage reductions. There will be short term increase in the carbon footprint associated with the installation of the	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

	1.c. Enable the growth ambitions of the study area to be realised?	new PRV's. However, there should be associated carbon savings associated with the reduced water and pumping requirements. This will result in positive effects for SEA objectives 8 and 9 during operation.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A		-1	1	There will be short term increase in the carbon footprint associated with the installation of the new PRV's. However, carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings.	
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A		0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This will maximise the company's resilience to climate change and the associated decrease in water availability.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A		0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.	
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	modifications?													
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.16 LE424

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This option requires installation of new pressure reducing valves to attain leakage reductions. There will be short term increase in the carbon footprint associated with the installation of the new pressure reducing valves. However, there should be associated carbon savings associated with the reduced water and pumping requirements. This will result in positive effects for SEA objectives 8 and 9.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 - 25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	There will be short term increase in the carbon footprint associated with the installation of the new pressure reducing vales. However, carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This will maximise the company's resilience to climate change and the associated decrease in water availability.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	water bodies?													
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.17 LE1011

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option requires installation of new trunk mains equipment and replacement of some existing equipment. There will be short term increase in the carbon footprint associated with the installation of the new equipment. However, there should be associated carbon savings associated with the reduced water and pumping requirements. This will result in positive effects for SEA objectives 8 and 9.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 - 25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	There will be short term increase in the carbon footprint associated with the installation of the equipment. However, carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This will maximise the company's resilience to climate change and the associated decrease in water availability.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	water bodies?													
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 - 25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.18 LE1008

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option requires renewal of communication pipes. There will be short term increase in the carbon footprint associated with the installation of the new equipment. However, there should be associated carbon savings associated with the reduced water and pumping requirements. This will result in positive effects for SEA objectives 8 and 9. There may be some supply disruptions during construction which will result in a negative construction phase effect for SEA objective 1. There is also likely to be a minor negative construction phase effect for objective 3 due to pedestrian and vehicle delays as a result of construction activities.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There may be some supply disruptions during construction.	0
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	Impact to pedestrian and vehicle delays are considered likely during construction. However, assuming appropriate reinstatement there should be no negative effects during operation.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0	Potential for an impact on biodiversity during construction but the location of works is not known at this stage. It is assumed that designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0		
	5.c. Impact on non-native species?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0		
	5.e. Provide opportunities for biodiversity enhancement?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0	Potential for an impact on landscape/townscape during construction but the location of works is not known at this stage. It is assumed that there designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0
	6.b. Provide opportunities for landscape enhancement?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	There will be short term increase in the carbon footprint associated with the installation of the equipment. However, carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This will maximise the company's resilience to climate change and the associated decrease in water availability.	

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0	Potential for an impact on the historic environment during construction but the location of works is not known at this stage. It is assumed that there designated sites for heritage can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0		0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.19 LE1012

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option requires renewal of selected DMAs. There will be a short term increase in the carbon footprint associated with the installation of the new equipment. However, there should be associated carbon savings associated with the reduced water and pumping requirements. This will result in positive effects for SEA objectives 8 and 9. There may be some supply disruptions during construction which will result in a negative construction phase effect for SEA objective 1. There is also likely to be minor negative construction phase effects for SEA objective 3 due to pedestrian and vehicle delays as a result of construction activities.	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There may be some supply disruptions during construction.	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A		-1	0	Impact to pedestrian and vehicle delays are considered likely during construction. However, assuming appropriate reinstatement there should be no negative operational phase effects.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0	Potential for an impact on biodiversity during construction but the location of works is not known at this stage. It is assumed that designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0			
	5.c. Impact on non-native species?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0			
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0			
	5.e. Provide opportunities for biodiversity enhancement?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0			
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0	Potential for an impact on landscape/townscape during construction but the location of works is not known at this stage. It is assumed that there designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0	
	6.b. Provide opportunities for landscape enhancement?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0			
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A	0	

8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	There will be short term increase in the carbon footprint associated with the installation of the equipment. However, carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This will maximise the company's resilience to climate change and the associated decrease in water availability.	1
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0	Potential for an impact on the historic environment during construction but the location of works is not known at this stage. It is assumed that there designated sites for heritage can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0	Element of uncertainty as the location is unknown at this stage.	0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.20 LE1009

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option requires complete renewal of DMAs. There will be a short term increase in the carbon footprint associated with the installation of the new equipment. However, there should be associated carbon savings associated with the reduced water and pumping requirements. This will result in positive effects for SEA objectives 8 and 9. There may be some supply disruptions during construction which will result in a negative construction phase effect for SEA objective 1. There is also likely to be minor negative construction phase effects for SEA objective 3 due to pedestrian and vehicle delays as a result of construction activities .	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	There may be some supply disruptions during construction.	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	N/A	-1	0	Impact to pedestrian and vehicle delays are considered likely during construction. However, assuming appropriate reinstatement there should be no operational phase effects.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	N/A	0	0	Potential for an impact on biodiversity during construction but the location of works is not known at this stage. It is assumed that designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	N/A	0	0			
	5.c. Impact on non-native species?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	N/A	0	0			
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	N/A	0	0			
	5.e. Provide opportunities for biodiversity enhancement?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	N/A	0	0			
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	N/A	0	0	Potential for an impact on landscape/townscape during construction but the location of works is not known at this stage. It	0	

	6.b. Provide opportunities for landscape enhancement?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0	is assumed that there designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	There will be short term increase in the carbon footprint associated with the installation of the equipment. However, carbon savings related to the reduction in the volume of water supplied and therefore reduced pumping / heating requirements over operational phase should result in carbon savings.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This will maximise the company's resilience to climate change and the associated decrease in water availability.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0	Potential for an impact on the historic environment during construction but the location of works is not known at this stage. It is assumed that there designated sites for heritage can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0
	13. b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0		0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.21 LE1007

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option requires enhanced SP repair policy. There will be a minor increase in the carbon footprint associated with travel for home visits. However, there should be associated carbon savings associated with the reduced water and pumping requirements. This will result in positive effects for SEA objectives 8 and 9. There may be some supply disruptions during construction which will result in a negative construction phase effect for SEA objective 1. There is also likely to be minor negative construction phase effects for SEA objective 3 due to pedestrian and vehicle delays as a result of construction activities.	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	Moderate	N/A	-1	0	There may be some supply disruptions during construction.	0
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A	-1	0	Impact to pedestrian and vehicle delays are considered likely during construction. However, assuming appropriate reinstatement there should be no operational phase effects.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0	Potential for an impact on biodiversity during construction but the location of works is not known at this stage. It is assumed that designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0		
	5.c. Impact on non-native species?		?	N/A	Short term	N/A	Temporary	N/A	?	?	N/A	0	0		

	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?			(< 5 years)		Temporary	N/A	?	?	N/A		0	0	
	5.e. Provide opportunities for biodiversity enhancement?			(< 5 years)		Temporary	N/A	?	?	N/A		0	0	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?			(< 5 years)		Temporary	N/A	?	?	N/A		0	0	Potential for an impact on landscape/townscape during construction but the location of works is not known at this stage. It is assumed that there designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual effects are neutral. Element of uncertainty as the location is unknown at this stage.
	6.b. Provide opportunities for landscape enhancement?			(< 5 years)		Temporary	N/A	?	?	N/A		0	0	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?					N/A	N/A	N/A	N/A	N/A		0	0	N/A
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A		-1	1	There will be a short term increase in the carbon footprint associated with home visits for the home visits. However, the associated carbon savings associated with the reduced water and pumping requirements should outweigh this effect during operation.
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A		0	1	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A		0	1	Reduction in water requirement should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A		0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0	Potential for an impact on the historic environment during construction but the location of works is not known at this stage. It is assumed that there designated sites for heritage can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0		0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.22 LE955

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option requires reduction in DMA size in Zone R07 only. Impact to pedestrian and vehicle delays are considered likely during construction, and will periodically reoccur every 10 years. There will be negative effects against SEA objective 3a for both construction and operation. However, assuming appropriate reinstatement there should be no operational phase effects between these installations.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	There will be short term increase in the carbon footprint associated with the additional energy required for the loggers and meters. However, carbon savings related to the reduction in the volume of water supplied over operational phase should result in carbon savings. This will result in positive effects for SEA objectives 8 and 9.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	Moderate	N/A	-1	-1	Pedestrian and vehicle delays are considered likely during construction, and will periodically reoccur every 10 years. However, assuming appropriate reinstatement there should be no operational phase effects between these installations.	-1
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0	Potential for an impact on biodiversity during construction and operation but the location of works is not known at this stage. It is assumed that designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual negative effects are neutral.	0
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0		
	5.c. Impact on non-native species?	?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0		
	5.e. Provide opportunities for biodiversity enhancement?	?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0	Potential for an impact on landscape/townscape during construction and operation but the location of works is not known at this stage. It is assumed that there designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual negative effects are neutral.	0
	6.b. Provide opportunities for landscape enhancement?	?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	-1	1	There will be short term increase in the carbon footprint associated with the additional energy required for the loggers and meters. However, carbon savings related to the reduction in the volume of water supplied over operational phase should result in carbon savings.	1
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in water requirement should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	10.c. Alter water table levels and amount of water within aquifers?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?		?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0	Potential for an impact on the historic environment during construction and operation but the location of works is not known at this stage. It is assumed that there designated sites for heritage can be avoided and suitable mitigation is available to ensure that any residual negative effects are neutral.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?		?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0		0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.23 LE1006

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option requires reduction in DMA size in Zone R08 only. Impact to pedestrian and vehicle delays are considered likely during construction, and will periodically reoccur every 10 years. There will be negative effects against SEA objective 3a for both construction and operation. However, assuming appropriate reinstatement there should be no operational phase effects between these installations. There will be short term increase in the carbon footprint associated with the additional energy required for the loggers and meters. However, carbon savings related to the	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	The option requires reduction in DMA size in Zone R08 only. Impact to pedestrian and vehicle delays are considered likely during construction, and will periodically reoccur every 10 years. There will be negative effects against SEA objective 3a for both construction and operation. However, assuming appropriate reinstatement there should be no operational phase effects between these installations. There will be short term increase in the carbon footprint associated with the additional energy required for the loggers and meters. However, carbon savings related to the	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	reduction in the volume of water supplied over operational phase should result in carbon savings. This will result in positive effects for SEA objectives 8 and 9.	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	Moderate	N/A	-1	-1	Impact to pedestrian and vehicle delays are considered likely during construction, and will periodically reoccur every 10 years. However, assuming appropriate reinstatement there should be no operational phase effects between these installations.	-1	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	N/A	0	0	Potential for an impact on biodiversity during construction and operation but the location of works is not known at this stage. It is assumed that designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual negative effects are neutral.	0
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	N/A	0	0		
	5.c. Impact on non-native species?		?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	N/A	0	0		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	N/A	0	0		
	5.e. Provide opportunities for biodiversity enhancement?		?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	N/A	0	0		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	N/A	0	0	Potential for an impact on landscape/townscape during construction and operation but the location of works is not known at this stage. It is assumed that there designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual negative effects are neutral.	0
	6.b. Provide opportunities for landscape enhancement?	?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	N/A	0	0			
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A	N/A	-1	1	There will be short term increase in the carbon footprint associated with the additional energy required for the loggers and meters. However, carbon savings related to the reduction in the volume of water supplied over operational phase should result in carbon savings.	1	
	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	N/A	0	1			Reduction in water requirement should result in water savings over the operational phase. This will maximise the company's resilience to climate change and the associated decrease in water availability.

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in water requirement should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0	Potential for an impact on the historic environment during construction and operation but the location of works is not known at this stage. It is assumed that there designated sites for heritage can be avoided and suitable mitigation is available to ensure that any residual negative effects are neutral.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	?	?	Short term (< 5 years)	Long term >25 years	Temporary	Temporary	?	?	N/A	0	0		0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

7.1.1.24 LE1010

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst case operational effect
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The option requires enhanced use of WSP meters. There will be a short term increase in the carbon footprint associated with the installation of the new equipment. However, there should be associated carbon savings	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Local	Moderate	N/A	-1	0	There may be some supply disruptions during construction.	0
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

	1.c. Enable the growth ambitions of the study area to be realised?	associated with the reduced water and pumping requirements. This will result in positive effects for SEA objectives 8 and 9. There may be some supply disruptions during construction which will result in a negative construction phase effect for SEA objective 1. There is also likely to be minor negative construction phase effects for SEA objective 3 due to pedestrian and vehicle delays as a result of construction activities.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		High	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Moderate	N/A		-1	0	Impact to pedestrian and vehicle delays are considered likely during construction. However, assuming appropriate reinstatement there should be no operational phase effects.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0	Potential for an impact on biodiversity during construction but the location of works is not known at this stage. It is assumed that designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0		
	5.c. Impact on non-native species?		?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0		
	5.e. Provide opportunities for biodiversity enhancement?		?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0	Potential for an impact on landscape/townscape during construction but the location of works is not known at this stage. It is assumed that there designated sites for biodiversity can be avoided and suitable mitigation is available to ensure that any residual effects are neutral. Element of uncertainty as the location is unknown at this stage.	0
	6.b. Provide opportunities for landscape enhancement?		?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A		0	0		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		0	0	N/A	0	
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	High	High	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	Regional	Moderate	N/A		-1	1	There will be a short term increase in the carbon footprint associated with home visits for the home visits. However, the associated carbon savings associated with the reduced water and pumping requirements should outweigh this effect during operation.	1	

	8.b. Maximise the company's resilience to a changing climate?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in water requirement should result in water savings over the operational phase. This will maximise the company's resilience to climate change and the associated decrease in water availability.	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in water requirement should result in water savings over the operational phase. This should reduce the overall impact of Affinity Water's activities on the local environment and therefore help boost the environment's resilience to the effects of climate change.	1
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	Reduction in the volume of water lost to leakage should result in water savings over the operational phase. This should alleviate pressure from water resources in the supply area.	1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0	Potential for an impact on the historic environment during construction but the location of works is not known at this stage. It is assumed that there designated sites for heritage can be avoided and suitable mitigation is available to ensure that any residual effects during construction are neutral. Element of uncertainty as the location is unknown at this stage.	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	?	N/A	Short term (< 5 years)	N/A	Temporary	N/A	?	?	N/A	0	0		0
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

8. Drought

8.1.1.1 AMER

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD score	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This scheme is an Affinity Water drought permit to increase abstraction temporarily to meet the pre sustainability reductions peak DO of 12 MI/d (and potentially average DO of 7 MI/d). This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3MI/d equates to a minor positive effect. Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river. Improvements expected to be noted downstream of Amersham at the Chalfontons primarily. Minor negative operational phase effects are predicted for objectives 10 and 11 as reduction in water volume is expected, which may affect quality but effect should be minor compared to natural drought impacts.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3MI/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	This scheme is an Affinity Water drought permit to increase abstraction temporarily to meet the pre sustainability reductions peak DO of 12 MI/d (and potentially average DO of 7 MI/d). This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3MI/d equates to a minor positive effect. Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river. Improvements expected to be noted downstream of Amersham at the Chalfontons primarily. Minor negative operational phase effects are predicted for objectives 10 and 11 as reduction in water volume is expected, which may affect quality but effect should be minor compared to natural drought impacts.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Low flows are well known to residents at present. Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	This scheme is an Affinity Water drought permit to increase abstraction temporarily to meet the pre sustainability reductions peak DO of 12 MI/d (and potentially average DO of 7 MI/d). This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3MI/d equates to a minor positive effect. Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river. Improvements expected to be noted downstream of Amersham at the Chalfontons primarily. Minor negative operational phase effects are predicted for objectives 10 and 11 as reduction in water volume is expected, which may affect quality but effect should be minor compared to natural drought impacts.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	This scheme is an Affinity Water drought permit to increase abstraction temporarily to meet the pre sustainability reductions peak DO of 12 MI/d (and potentially average DO of 7 MI/d). This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3MI/d equates to a minor positive effect. Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river. Improvements expected to be noted downstream of Amersham at the Chalfontons primarily. Minor negative operational phase effects are predicted for objectives 10 and 11 as reduction in water volume is expected, which may affect quality but effect should be minor compared to natural drought impacts.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	This scheme is an Affinity Water drought permit to increase abstraction temporarily to meet the pre sustainability reductions peak DO of 12 MI/d (and potentially average DO of 7 MI/d). This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 3MI/d equates to a minor positive effect. Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river. Improvements expected to be noted downstream of Amersham at the Chalfontons primarily. Minor negative operational phase effects are predicted for objectives 10 and 11 as reduction in water volume is expected, which may affect quality but effect should be minor compared to natural drought impacts.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.	0	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	5.c. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0

	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.	
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river. Improvements expected to be noted downstream of Amersham at the Chalfonts primarily.	1
	6.b. Provide opportunities for landscape enhancement?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river. Improvements expected to be noted downstream of Amersham at the Chalfonts primarily.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing. Improvements expected to be noted downstream of Amersham at the Chalfonts primarily.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Short term (< 5 years)	N/A	Temporary	Local	High	N/A	0	-1	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use targeted and this should limit additional drying (although potential for prolonged use under extreme drought).	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Short term (< 5 years)	N/A	Temporary	Local	High	N/A	0	-1	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use targeted and this should limit additional drying (although potential for prolonged use under extreme drought).	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

8.1.1.2 HUNT

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD score
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	This scheme represents the use of a drought permit (e.g. once every 50 to 75 years) where the flow constraint on the Gaddesden Group Licence would be lifted, allowing an increase in abstraction to the full unconstrained licensed volume of 12 Ml/d. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.91Ml/d equates to a minor positive effect. Minor positive effect also predicted against SA Objective 6 as a result of morphological improvements which will improve the local landscape immediately adjacent to the river. Minor negative operational phase effects are predicted for objectives 10 and 11 as reduction in water volume is expected, which may affect quality but effect should be minor compared to natural drought impacts.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.91Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	Minor negative operational phase effects are predicted for objectives 10 and 11 as reduction in water volume is expected, which may affect quality but effect should be minor compared to natural drought impacts.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Low flows are well known to residents at present. Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Low flows are well known to residents at present. Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0

	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.	0
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Impacts to species expected from natural drought conditions, will be exacerbated by abstraction but these effects considered to be minor compared to natural drought conditions as abstraction targets peak demand periods (although potential for prolonged use).	
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.	
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river.	1
	6.b. Provide opportunities for landscape enhancement?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river. I	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	Increased abstraction and treatment of iron will use more energy but not considered significant as the scheme will only operate for peak demand.	0
	8.b. Maximise the company's resilience to a changing climate?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing. Improvements expected to be noted downstream of Amersham at the Chalfonts primarily.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Short term (< 5 years)	N/A	Temporary	Local	High	N/A	0	-1	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use targeted and this should limit additional drying (although potential for prolonged use under extreme drought).	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Short term (< 5 years)	N/A	Temporary	Local	High	N/A	0	-1	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use targeted and this should limit additional drying (although potential for prolonged use under extreme drought).	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

8.1.1.3 BOWB

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp		Worst	
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration	1.a. Provide affordable access to clean water adequate to support health?	The Bowbridge licence was revoked as part of the AMP6 sustainability reductions in 2016. This scheme is to implement a	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option.	1	

ambitions of the study area?	1.b. Ensure that customers are not disproportionality affected by cost?	drought permit to temporarily reinstate abstraction of 5.82 MI/d from the Bowbridge source. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5.82MI/d equates to a minor positive effect.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	5.82MI/d equates to a minor positive effect.		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	Minor positive effect also predicted against SA Objective 6 as a result of morphological improvements which will improve the local landscape immediately adjacent to the river. Minor negative effect for SA Objective 8 predicted as increased abstraction will use more energy; however, not considered significant as the scheme will only operate for a limited period of time. Minor negative operational phase effects are predicted for objectives 10 and 11 as reduction in water volume is expected, which may affect quality but effect should be minor compared to natural drought impacts.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No in-stream activities possible. Flow reductions will be perceived but are the result of drought and not scheme operation.	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		No in-stream activities possible. Flow reductions will be perceived but are the result of drought and not scheme operation.
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		No new infrastructure required.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		No new infrastructure required.
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		No new infrastructure required.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.	0	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Impacts to species expected from natural drought conditions, will be exacerbated by abstraction but these effects considered to be minor compared to natural drought conditions as abstraction targets peak demand periods (although potential for prolonged use).		
	5.c. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.		
	5.e. Provide opportunities for biodiversity enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river.	1	
	6.b. Provide opportunities for landscape enhancement?		N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river. I		
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	-1	Increased abstraction will use more energy but not considered significant as the scheme will only operate for peak demand.	-1	
	8.b. Maximise the company's resilience to a changing climate?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing. Improvements expected to be noted downstream of Amersham at the Chalfonts primarily.	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Short term (< 5 years)	N/A	Temporary	Local	High	N/A	0	-1	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use targeted and this should limit additional drying (although potential for prolonged use under extreme drought).	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Short term (< 5 years)	N/A	Temporary	Local	High	N/A	0	-1	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use targeted and this should limit additional drying (although potential for prolonged use under extreme drought).	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

8.1.1.4 HUGH

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst

1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The licence for the Hughenden source was revoked in April 2017 as part of Affinity Water's Sustainability Reductions. A drought permit will be required to bring HUGH back into supply under severe drought (e.g. once every 50 to 75 years), with the target of abstracting the Peak demand Deployable Output rate of 1.75 Ml/d. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5.82Ml/d equates to a minor positive effect.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5.82Ml/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	Minor negative effect for SA Objective 8 predicted as increased abstraction will use more energy; however, not considered significant as the scheme will only operate for a limited period of time. Minor negative operational phase effects are predicted for objectives 10 and 11 as reduction in water volume is expected, which may affect quality but effect should be minor compared to natural drought impacts.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No in-stream activities possible. Flow reductions will be perceived but are the result of drought and not scheme operation.	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			No in-stream activities possible. Flow reductions will be perceived but are the result of drought and not scheme operation.
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			No new infrastructure required.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			No new infrastructure required.
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			No new infrastructure required.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Option Dossier indicates 75 m of pipeline will be needed to connect the borehole to the treatment works. The works lies within 50 m of BAP habitat deciduous woodland. During construction there could be dust or other proximity related construction impacts without mitigation.	0	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0			
	5.c. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			N/A
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			No conservation sites along river or groundwater dependent sites.
	5.e. Provide opportunities for biodiversity enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			N/A
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No landscape changes in catchment anticipated.	0	
	6.b. Provide opportunities for landscape enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			No landscape changes in catchment anticipated.
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?		Low	Low	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	N/A	Low	N/A	-1	-1	Increased abstraction will use more energy but not considered significant as the scheme will only operate for a limited period of time.	-1	

	8.b. Maximise the company's resilience to a changing climate?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	-1
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Short term (< 5 years)	N/A	Temporary	Local	High	N/A	0	-1	Reduction in water volume expected which may affect quality, but the effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will have no effect on the Hughenden stream. Targets peak-use, which should limit additional drying (although average use is possible).	
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Short term (< 5 years)	N/A	Temporary	Local	High	N/A	0	-1	Reduction in water volume expected which may affect quality, but the effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will have no effect on the Hughenden stream. Targets peak-use, which should limit additional drying (although average use is possible).	-1
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

8.1.1.5 WHIH

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		Operational effect (worst case)
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration	1.a. Provide affordable access to clean water adequate to support health?	This permit is required to temporarily abstract the pre sustainability reduction peak DO of 28 MI/d, a potential increase of 18	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option.	1

ambitions of the study area?	1.b. Ensure that customers are not disproportionality affected by cost?	MI/d. If the drought is prolonged the potential average increase may be 16.18 MI/d. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 18.18MI/d equates to a minor positive effect. A minor positive effect is predicted for objective 6 as morphological improvements are ongoing which will improve drought resilience and reduce the impact on the riverine habitat from drought and operation of the scheme. Improvements expected to be noted throughout Beane valley.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	18.18MI/d equates to a minor positive effect.	
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	A minor negative effect is predicted for objective 8 as increased abstraction will use more energy but not considered significant as the scheme will only target peak demand period. Minor negative operational phase effects are predicted for objectives 10 and 11 as reduction in water volume is expected, which may affect quality but effect should be minor compared to natural drought impacts.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No in-stream activities possible. Flow reductions will be perceived but are the result of drought and not scheme operation.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Reduction in water volume expected which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use targeted which should limit additional drying (although potential for prolonged operation under extreme drought). There is the potential for disturbance (noise, light, dust etc.) to the Dane End Tributary during the construction works at the SACO site. A CEMP should be in place during construction.	
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.	0
	5.b. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.c. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		Low	N/A	Short term (< 5 years)	N/A	Temporary	N/A	Local	Low	N/A	-1	0	The SACO site is 200m from an area of BAP Priority habitat deciduous woodland, and is located next to the Dane End Tributary. There is also the potential for disturbance to BAP Priority habitat deciduous woodland and river habitats. A CEMP should be in place during construction.	
	5.d. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.	
	5.e. Provide opportunities for biodiversity enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements are ongoing which will improve drought resilience and reduce the impact on the riverine habitat from drought and operation of the scheme. Improvements expected to be	1

													noted throughout Beane valley.	
	6.b. Provide opportunities for landscape enhancement?												Morphological improvements are ongoing which will improve drought resilience and reduce the impact on the riverine habitat from drought and operation of the scheme. Improvements expected to be noted throughout Beane valley.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?												N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	N/A	Low	N/A			Increased abstraction will use more energy but not considered significant as the scheme will only target peak demand period.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	0
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A			Morphological improvements are ongoing which will improve drought resilience and reduce the impact on the riverine habitat from drought and operation of the scheme. Improvements expected to be noted throughout Beane valley.	
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	0
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Short term (< 5 years)	N/A	Temporary	Local	High	N/A			Reduction in water volume expected which may affect quality, but the effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will have no effect on the Hughenden stream. Targets peak-use, which should limit additional drying (although average use is possible).	-1
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	0
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Short term (< 5 years)	N/A	Temporary	Local	High	N/A			Reduction in water volume expected which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use targeted which should limit additional drying (although potential for prolonged operation under extreme drought). There is the potential for disturbance (noise, light, dust etc.) to the Dane End Tributary during the construction works at the SACO site. A CEMP should be in place during construction.	0
		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A	0

	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A										
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0									

8.1.1.6 FRIA

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD Score
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The Friars Wash source has an annual average licence volume of 3.8 MI/d and retains a peak licence of 15.91 MI/d post sustainability reductions. By declaring an emergency under the Ver Operating Agreement, Affinity Water can increase the annual average volume to that of the original average licence volume (15.91 MI/d). Therefore a drought permit application is not required (unlike for other drought plan options). Note that the benefit of the scheme is only 9.79 MI/d and not 12.11 MI/d owing to deployable output constraints at the Friars Wash source. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 9.79MI/d equates to a minor positive effect.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 9.79MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	Morphological improvements are ongoing which will improve local areas of Landscape in close proximity to the river. Improvements expected to be noted throughout Ver valley. This will result in minor positive operational phase effects for objectives 6 and 10. Increased abstraction will use more energy but not considered significant as the scheme will only target peak demand period, this will however result in a minor negative effect for SEA objective 8.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No in-stream activities possible. Flow reductions will be perceived but are the result of drought and not scheme operation. Reduction in water volume expected which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use targeted which should limit additional drying (although potential for prolonged operation under extreme drought). There is the potential for disturbance (noise, light, dust etc.) to the Dane End Tributary during the construction works at the SACOHAD site. A CEMP should be in place during construction.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	0	0	No new infrastructure required.	0								
	4.b. Result in higher levels of reuse of waste?	N/A	0	0	No new infrastructure required.									
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	0	0	No conservation sites along river or groundwater dependent sites.	0								
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	0	0	N/A									
	5.c. Impact on non-native species?	N/A	0	0	N/A									
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	0	0	No conservation sites along river or groundwater dependent sites.									
	5.e. Provide opportunities for biodiversity enhancement?	N/A	0	0	N/A									

6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1	Morphological improvements are ongoing which will improve local areas of Landscape in close proximity to the river. Improvements expected to be noted throughout Ver valley.	1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1	Morphological improvements are ongoing which will improve local areas of Landscape in close proximity to the river. Improvements expected to be noted throughout Ver valley.	1
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	High	N/A	0	-1	Increased abstraction will use more energy but not considered significant as the scheme will only target peak demand period. No new infrastructure required so neutral effect in the short term.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements are ongoing which will improve drought resilience and reduce the impact on the riverine habitat from drought and operation of the scheme. Improvements expected to be noted throughout Beane valley.	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	10. c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Reduction in water volume expected which may affect quality, but the effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Data from sustainability reductions monitoring suggests little impact on flow from Friars Wash.	0

	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	N/A									
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Reduction in water volume expected which may affect quality, but the effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Data from sustainability reductions monitoring suggests little impact on flow from Friars Wash.	0								
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A	0								
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A									
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0								

8.1.1.7 WELL

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	Worst
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The Well Head source has a Memorandum of Understanding (MoU) requiring Affinity Water to support flows in the upper River Hiz through augmentation of the Mill Pond. Under extreme drought conditions, Affinity Water would apply for a drought permit to reduce this pond / river support, such that an additional 0.3 Ml/d is available for supply. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.3Ml/d equates to a minor positive effect. No other additional impacts identified.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 0.3Ml/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		

2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	N/A	0	0	Scheme impact considered not to make a significantly perceptible difference compared to overall natural impact of drought.	0								
	2.b. Alter water levels that affect water-based recreation assets?	N/A	0	0	Scheme impact considered not to make a significantly perceptible difference compared to overall natural impact of drought.									
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?	N/A	0	0	No new infrastructure required.									
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	N/A	0	0	No new infrastructure required.	0								
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	0	0	No new infrastructure required.									
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	0	0	No new infrastructure required.	0								
	4.b. Result in higher levels of reuse of waste?	N/A	0	0	No new infrastructure required.									
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	0	0	Impacts to species expected from natural drought conditions, which the augmentation offers limited prevention.	0								
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	0	0	N/A									
	5.c. Impact on non-native species?	N/A	0	0	N/A									
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	0	0	No conservation sites along river or groundwater dependent sites.									
	5.e. Provide opportunities for biodiversity enhancement?	N/A	0	0	N/A									
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	0	0	No new infrastructure required.	0								
	6.b. Provide opportunities for landscape enhancement?	N/A	0	0	No new infrastructure required.									
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	0	0	N/A	0								
8. Minimise the carbon footprint of the Company?	8.a.Reduce / increase predicted carbon footprint?	N/A	0	0	N/A	0								
	8.b. Maximise the company's resilience to a changing climate?	N/A	0	0	N/A									
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	0	0	N/A	0								
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	0	0	N/A	0								
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	N/A									
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	Augmentation scheme currently is not considered to significantly benefit flows during drought with much augmented water lost to the aquifer, preventing a wetted perimeter to remain continuous downstream. Most impact is therefore natural drought effects.									
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	N/A									

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Augmentation scheme currently is not considered to significantly benefit flows during drought with much augmented water lost to the aquifer, preventing a wetted perimeter to remain continuous downstream. Most impact is therefore natural drought effects.	0									
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A	0									
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0									
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A										
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0									

8.1.1.8 PICC

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	Following the 2018 Sustainability Reduction in the catchment, average annual abstraction from Piccotts End will reduce from 15.72 MI/d to 5.72 MI/d (i.e. by 10 MI/d) and the peak daily abstraction will reduce from 15.72 MI/d to 10.72 MI/d (i.e. by 5 MI/d). This scheme is to temporarily increase abstraction at the source by 5 MI/d under a drought permit. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5MI/d equates to a minor positive effect.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 5MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	Morphological improvements are ongoing which will improve local areas of Landscape in close proximity to the river. This will result in minor positive effects for objective 6 and 10. Increased abstraction will use more energy but not considered significant as the scheme will only target peak demand period, this will however result in a minor negative effect for SEA objective 8.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Scheme impact considered not to make a significantly perceptible difference compared to overall natural impact of drought.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	No new infrastructure required.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	No new infrastructure required.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	Impacts to species expected from natural drought conditions, which the augmentation offers limited prevention.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Impacts to species expected from natural drought conditions, which the augmentation offers limited prevention.	0

	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.	
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1	Morphological improvements are ongoing which will improve local areas of Landscape in close proximity to the river.	1
	6.b. Provide opportunities for landscape enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1	Morphological improvements are ongoing which will improve local areas of Landscape in close proximity to the river.	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	High	0	-1	Increased abstraction will use more energy but not considered significant as the scheme will largely operate for peak demand. No new infrastructure required so neutral effect in the short term.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	0	1	Morphological improvements such as removal of weirs are ongoing. Improvements expected to be noted downstream of Amersham at the Chalfonts primarily.	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	10.c. Alter water table levels and amount of water within aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Augmentation scheme currently is not considered to significantly benefit flows during drought with much augmented water lost to the aquifer, preventing a wetted perimeter to remain continuous downstream. Most impact is therefore natural drought effects.	
	10.d. Increase the risk of saline intrusion or other pollution risks to the	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	aquifers?														
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Augmentation scheme currently is not considered to significantly benefit flows during drought with much augmented water lost to the aquifer, preventing a wetted perimeter to remain continuous downstream. Most impact is therefore natural drought effects.	0									
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A	0									
13. Conserve and enhance the historic environment, heritage assets and their settings?	13.a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0									
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A										
14. Minimise loss of soil quality and sterilisation of mineral resources?	14.a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0									

8.1.1.9 UTTL

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	Under the UTTL licence, Affinity Water is required to provide a support flow to the River Cam when flows at the Great Chesterford gauging station fall below 12.7 MI/d. The river support can be up to half of that being taken into supply, with the intention of maintaining a flow of 12.7 MI/d at the gauging station. By releasing this condition under a drought permit, up to 6 MI/d of water could be utilised. This scheme is to remove the requirement to augment flows in the River Cam and use this water for additional supply. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 6MI/d equates to a minor positive effect.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 6MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	A minor negative effect on objective 5 is predicted as there will be impacts to species expected from natural drought conditions, which ordinarily are prevented by augmentation. No change in abstraction but assumed more water in supply network will use more energy but not considered significant as the scheme will	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Scheme impact considered not to make a significantly perceptible difference compared to overall natural impact of drought.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	largely operate for peak demand (although prolonged use is possible under extreme drought). There will be minor negative effects on option 8 because although there is no change in abstraction it is assumed more water in supply network will use more energy but not considered significant as the scheme will largely operate for peak demand (although prolonged use is possible under extreme drought).	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		No new infrastructure required.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Impacts to species expected from natural drought conditions, which the augmentation offers limited prevention.	-1
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.c. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	-1	The site is adjacent to an area of BAP Priority habitat deciduous woodland, and the River Cam. However, as no construction is required there is no effect anticipated. However, Impacts to species expected from natural drought conditions, which ordinarily are prevented by augmentation.	
	5.e. Provide opportunities for biodiversity enhancement?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	High	N/A	N/A	0	0		
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	6.b. Provide opportunities for landscape enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	High	N/A	N/A	0	-1	No change in abstraction but assumed more water in supply network will use more energy but not considered significant as the scheme will largely operate for peak demand (although prolonged use is possible under extreme drought). No new infrastructure required so neutral effect in the short term.	-1	
	8.b. Maximise the company's resilience to a changing climate?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0	
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A		
	10.c. Alter water table levels and amount of water within aquifers?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	High	N/A	N/A	0	0	Significant reduction in water volume expected which may affect quality though this would lead toward more natural drought impacts (i.e. free of flow augmentation).		

	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	High	N/A	0	0	Significant reduction in water volume expected which may affect quality though this would lead toward more natural drought impacts (i.e. free of flow augmentation).	0
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
13. Conserve and enhance the historic environment, heritage assets and their settings?	13.a. Conserve and/or enhance heritage assets and the historic environment?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
14. Minimise loss of soil quality and sterilisation of mineral resources?	14.a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0

8.1.1.10 THUN

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp			
			Con	Op	Con	Op	Con	Op							Worst	
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	Under the licence for the Thundridge source, Affinity Water is required to reduce abstraction from a peak of 11.82 MI/d to the Licence of Right volumes of 9.09 MI/d when the river flow condition at Wadesmill Gauging Station is triggered. The option is for a drought permit application to suspend this constraint and permit abstraction at the higher rate of 11.82 MI/d, regardless of flows in the Rib. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.37MI/d equates to a minor positive effect. No other effects are predicted.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.37MI/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	Under the licence for the Thundridge source, Affinity Water is required to reduce abstraction from a peak of 11.82 MI/d to the Licence of Right volumes of 9.09 MI/d when the river flow condition at Wadesmill Gauging Station is triggered. The option is for a drought permit application to suspend this constraint and permit abstraction at the higher rate of 11.82 MI/d, regardless of flows in the Rib. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.37MI/d equates to a minor positive effect. No other effects are predicted.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Scheme impact considered not to make a significantly perceptible difference compared to overall natural impact of drought.	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		Scheme impact considered not to make a significantly perceptible difference compared to overall natural impact of drought.
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		No new infrastructure required.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Under the licence for the Thundridge source, Affinity Water is required to reduce abstraction from a peak of 11.82 MI/d to the Licence of Right volumes of 9.09 MI/d when the river flow condition at Wadesmill Gauging Station is triggered. The option is for a drought permit application to suspend this constraint and permit abstraction at the higher rate of 11.82 MI/d, regardless of flows in the Rib. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO provided by the option. 2.37MI/d equates to a minor positive effect. No other effects are predicted.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		No new infrastructure required.

4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	0	0	No new infrastructure required.	0							
	4.b. Result in higher levels of reuse of waste?	N/A	0	0	No new infrastructure required.								
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	0	0	Impacts to species expected from natural drought conditions, which the augmentation offers limited prevention.	0							
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	0	0	N/A								
	5.c. Impact on non-native species?	N/A	0	0	N/A								
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	0	0	No conservation sites along river or groundwater dependent sites.								
	5.e. Provide opportunities for biodiversity enhancement?	N/A	0	0	N/A								
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	0	0	No new infrastructure required.	0							
	6.b. Provide opportunities for landscape enhancement?	N/A	0	0	No new infrastructure required.								
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	0	0	N/A	0							
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	N/A	0	0	Increased abstraction will use more energy but not considered significant as the scheme will only operate every 50 years or so in a drought.	0							
	8.b. Maximise the company's resilience to a changing climate?	N/A	0	0	N/A								
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	0	0	N/A	0							
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	0	0	N/A	0							
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	N/A								
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. AMP study indicates abstraction does not affect flow in the River Rib but groundwater discharges to the River Lee. Drought use only should limit reductions in flow.								
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	N/A								

11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. AMP study indicates abstraction does not affect flow in the River Rib but groundwater discharges to the River Lee. Drought use only should limit reductions in flow.	0									
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A	0									
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0									
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A										
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0									

8.1.1.11 FULL

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The licence for the Fulling Mill source is to be revoked in April 2018 as part of the company's sustainability reductions, though Affinity Water intend to cease abstraction from April 2017. A drought permit will be required to bring the source back into supply, abstracting at the historic peak deployable output volume of 9.09 MI/d. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 9.09 MI/d equates to a minor positive effect.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 9.09 MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionately affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river, and will result in positive effects for options 6 and 10.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No in-stream activities possible. Flow reductions will be perceived but are the result of drought and not scheme operation.	0
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	Increased abstraction will use more energy and will result in a minor negative effect for objective 8 but not considered significant as the scheme will only operate for peak demand.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0		

4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0
	4.b. Result in higher levels of reuse of waste?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.	0
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.c. Impact on non-native species?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.	
	5.e. Provide opportunities for biodiversity enhancement?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river.	1
	6.b. Provide opportunities for landscape enhancement?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing which will improve the local landscape immediately adjacent to the river. I	
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	Low	Low	Short term (< 5 years)	Medium term (5 -25 years)	Temporary	Temporary	N/A	Low	N/A	-1	-1	Increased abstraction will use more energy but not considered significant as the scheme will only operate for peak demand.	-1
	8.b. Maximise the company's resilience to a changing climate?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	0
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	Medium	N/A	Long term >25 years	N/A	Permanent	Local	Low	N/A	0	1	Morphological improvements such as removal of weirs are ongoing. Improvements expected to be noted downstream of Amersham at the Chalfonts primarily.	0
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A	

	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use focus should limit additional drying (although average use is possible in a prolonged drought). Note that modelling also considers the Chalk aquifer to be fully unconfined and possible confining layers from alluvium and boulder clay are not represented.									
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	N/A									
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. Modelling shows drought abstraction will lengthen drying reaches and time frame assuming constant use so should represent a worst case. Peak-use focus should limit additional drying (although average use is possible in a prolonged drought). Note that modelling also considers the Chalk aquifer to be fully unconfined and possible confining layers from alluvium and boulder clay are not represented.	0								
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A	0								
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A									
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0								

8.1.1.12 OUGH

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	Licence 6/33/13/11 permits the abstraction of 6.55 MI/d from Oughton pumping station with a licence condition requiring Affinity Water to support flows in the upper River Oughton when the water level at Oughton Head spring is at or	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 1 MI/d equates to a minor positive effect.	1

	1.b. Ensure that customers are not disproportionality affected by cost?	below 57.54 m AOD. The maximum volume of support is 0.45 Ml/d. Licence 6/33/13/9 permits the abstraction of 1.14 Ml/d from Offley Bottom pumping station. At the same trigger described above, Offley has to augment flow by up to 0.55 Ml/d. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 1 Ml/d equates to a minor positive effect. No change in abstraction but assumed more water in supply network will use more energy (but not considered significant as the scheme will only operate for peak demand). This could result in a minor negative effect on objective 8.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	N/A	0	1
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Scheme impact considered not to make a significantly perceptible difference compared to overall natural impact of drought.
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Scheme impact considered not to make a significantly perceptible difference compared to overall natural impact of drought.
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Impacts to species expected from natural drought conditions, which the augmentation offers limited prevention.
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	5.c. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.
	5.e. Provide opportunities for biodiversity enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
	6.b. Provide opportunities for landscape enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?		N/A	Medium	N/A	Medium term (5 -25 years)	N/A	Temporary	Local	High	N/A	0	-1	No change in abstraction but assumed more water in supply network will use more energy (but not considered significant as the scheme will only operate for peak demand.)
	8.b. Maximise the company's resilience to a changing climate?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A

9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	0	0	N/A	0								
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	0	0	N/A	0								
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	N/A									
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. AMP study indicates abstraction does not affect flow in the River Rib but groundwater discharges to the River Lee. Drought use only should limit reductions in flow.									
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	N/A									
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be minor compared to natural drought impacts. AMP study indicates abstraction does not affect flow in the River Rib but groundwater discharges to the River Lee. Drought use only should limit reductions in flow.	0								
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A	0								
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A									
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0								

8.1.1.13 SBUC

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		Worst
			Con	Op	Con	Op	Con	Op							
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The licence for SBUC applies to that source only and was granted on 31 March 2016 (original issue 30 May 2003). The licence is time limited and expires on 30 March 2028. Licensed rates of abstraction for SBUC are 4 MI/d average and 6 MI/d peak. The	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 4 MI/d equates to a minor positive effect.	1

	1.b. Ensure that customers are not disproportionality affected by cost?	MoU introduced a low flow condition and Special Condition 9.1 in the licence reduces the rate of abstraction for public water supply purpose to 4 Ml/d whenever the flow in the River Dour, as measured at Crabble Mill, falls below 0.209 cumecs (18.06 Ml/d). Whenever the reduced rate of abstraction is taking place, Affinity Water is required to make a release of 50% of the quantity of water abstracted into the River Dour for augmentation purposes. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 4 Ml/d equates to a minor positive effect. No change in abstraction but assumed more water in supply network will use more energy (but not considered significant as the scheme will only operate for peak demand).	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	N/A	0	1
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be small compared to natural drought impacts. Studies indicate limited connection between river and aquifer in source area and limited additional accretion downstream. Drought use only should limit reductions in flow.
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be small compared to natural drought impacts. Studies indicate limited connection between river and aquifer in source area and limited additional accretion downstream. Drought use only should limit reductions in flow.
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
5. Protect and enhance biodiversity including designated habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Impacts to species expected from natural drought conditions, which the option offers limited prevention.
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	5.c. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.
	5.e. Provide opportunities for biodiversity enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
	6.b. Provide opportunities for landscape enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A

8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	N/A	0	0	Increased abstraction will use more energy but not considered significant as the scheme will only operate every 50 years or so in a drought	0								
	8.b. Maximise the company's resilience to a changing climate?	N/A	0	0	N/A									
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	0	0	N/A	0								
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	0	0	N/A	0								
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	N/A									
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact									
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	N/A									
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact	0								
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A	0								
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A									
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0								

8.1.1.14 SHOL

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The original licence for SHOL was granted on 16 March 1981 and was amended (Amendment 04) on 25 June 2007 to include a low flow condition relating to the River Dour. The licence was then reissued on 7 March 2016 and the condition expires on 21 March 2028. The low flow condition limits abstraction to 2.5 MI/day when the flow in the River Dour (as measured at Crabble Mill)	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 0.77 MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		

	1.c. Enable the growth ambitions of the study area to be realised?	falls below 0.105 cumecs (11.23 Ml/d). This scheme is to release the flow related restriction to restore normal conditions peak abstraction; an increase of 0.77 Ml/d. In the case of prolonged drought this increase in yield benefit may extend to average conditions. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 4 Ml/d equates to a minor positive effect. No change in abstraction but assumed more water in supply network will use more energy (but not considered significant as the scheme will only operate for peak demand). This could result in a minor negative effect on objective 8.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be small compared to natural drought impacts. Studies indicate limited connection between river and aquifer in source area and limited additional accretion downstream. Groundwater flow from source may actually be toward sea. Drought use only should limit reductions in flow.
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be small compared to natural drought impacts. Studies indicate limited connection between river and aquifer in source area and limited additional accretion downstream. Groundwater flow from source may actually be toward sea. Drought use only should limit reductions in flow.
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Impacts to species expected from natural drought conditions, will be exacerbated by abstraction but these effects considered to be small compared to natural drought conditions.
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
	5.c. Impact on non-native species?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No conservation sites along river or groundwater dependent sites.
	5.e. Provide opportunities for biodiversity enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	N/A
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.
	6.b. Provide opportunities for landscape enhancement?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.

7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	0	0	N/A	0								
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	N/A	0	0	Increased abstraction will use more energy but not considered significant as the scheme will only operate every 50 years or so in a drought.	0								
	8.b. Maximise the company's resilience to a changing climate?	N/A	0	0	N/A									
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	0	0	N/A	0								
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	0	0	N/A	0								
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	N/A									
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact.									
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	N/A									
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact.	0								
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A	0								
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A									
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0								

8.1.1.15 SDRE

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters
			Probability		Duration		Permanence					Con	Opp		
			Con	Op	Con	Op	Con	Op							Worst
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The current licence to abstract water at SDRE was granted on 7 March 2016 (original issue 15 February 1967) and is a group licence covering SLYE, SDRE and SLOW. The group licence is not time-limited. The current licence to abstract water at SDRE is covered by the same group licence detailed above. Licensed rates of abstraction for SDRE are 9 MI/d average and 10 MI/d peak. A similar low flow restriction exists and Special Condition 1.2 of the MoU reduces the rate of abstraction at SDRE to 8 MI/d when groundwater levels at Wolverton observation borehole (OBH) is at or below 34.8 mAOD. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 1 MI/d equates to a minor positive effect.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 1 MI/d equates to a minor positive effect.	1
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1		
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	Reduction in water volume expected, which may affect quality but effect should be small compared to natural drought impacts. Studies indicate abstraction does not affect flow in the Upper River Dour but may affect lower reaches in River Dour. This can be mitigated by reducing abstraction before drought use if this can be anticipated and draw water from additional aquifer storage during drought should minimise downstream loss of baseflow. Drought use only should limit reductions in flow.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be small compared to natural drought impacts. Studies indicate abstraction does not affect flow in the Upper River Dour but may affect lower reaches in River Dour. This can be mitigated by reducing abstraction before drought use if this can be anticipated and draw water from additional aquifer storage during drought should minimise downstream loss of baseflow. Drought use only should limit reductions in flow.	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	No new infrastructure required.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0	
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	No new infrastructure required.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	No new infrastructure required.	0	
	4.b. Result in higher levels of reuse of waste?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0			

5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	0	0	Impacts to species expected from natural drought conditions, will be exacerbated by abstraction but these effects considered to be small compared to natural drought conditions.	0								
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	0	0	N/A									
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	0	0	N/A									
	5.c. Impact on non-native species?	N/A	0	0	No conservation sites along river or groundwater dependent sites.									
	5.e. Provide opportunities for biodiversity enhancement?	N/A	0	0	N/A									
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	0	0	No new infrastructure required.	0								
	6.b. Provide opportunities for landscape enhancement?	N/A	0	0	No new infrastructure required.									
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	0	0	N/A	0								
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	N/A	0	0	Increased abstraction will use more energy but not considered significant as the scheme will only operate every 50 years or so in a drought	0								
	8.b. Maximise the company's resilience to a changing climate?	N/A	0	0	N/A									
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	0	0	N/A	0								
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	0	0	N/A	0								
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	N/A									
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact									
	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	N/A									
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact	0								
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A	0								
13. Conserve and enhance the historic environment, heritage	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0								

assets and their settings?	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A										
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0									

8.1.1.16 SLYE

SEA Objective	Assessment questions (would the options / programme...?)	Impact Description	Likelihood of effect, taking into account						Scale of impact	Sensitivity of the receptor	Mitigation proposals	Residual effect		Effect Description	EBSD parameters	
			Probability		Duration		Permanence					Con	Opp		Worst	
			Con	Op	Con	Op	Con	Op								
1. Ensure the availability of adequate supply, and quality, of water to support health and hygiene and the regeneration ambitions of the study area?	1.a. Provide affordable access to clean water adequate to support health?	The current licence to abstract water at SLYE was granted on 7 March 2016 (original issue 15 February 1967) and is a group licence covering SLYE, SDRE and SLOW. The group licence is not time-limited. Licensed rates of abstraction for SLYE are 6 MI/d Average and 7 MI/d peak. However the MoU introduced a low flow condition. Special Condition 1.2 reduces the rate of abstraction at SLYE to 3.5 MI/d whenever the Wolverton Observation Borehole (OBH) is at or below 34.8m AOD. This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 2.5 MI/d equates to a minor positive effect.	N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1	This option will provide positive effects against all Objective 1 sub objectives. The significance of the effect is assessed against the DO (in the focal WRZ) provided by the option. 2.5 MI/d equates to a minor positive effect.	1	
	1.b. Ensure that customers are not disproportionality affected by cost?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
	1.c. Enable the growth ambitions of the study area to be realised?		N/A	High	N/A	Medium term (5 -25 years)	N/A	Temporary	Regional	Moderate	N/A	0	1			
2. Protect and enhance (and ensure access to) tourism, recreation and amenity facilities.	2.a. Result in increased water-based recreational opportunities or new tourist attractions?	Reduction in water volume expected, which may affect quality but effect should be small compared to natural drought impacts. Studies indicate abstraction does not affect flow in the Upper River Dour but may affect lower reaches in River Dour. This can be mitigated by reducing abstraction before drought use if this can be anticipated and draw water from additional aquifer storage during drought should minimise downstream loss of baseflow. Drought use only should limit reductions in flow.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	Reduction in water volume expected, which may affect quality but effect should be small compared to natural drought impacts. Studies indicate abstraction does not affect flow in the Upper River Dour but may affect lower reaches in River Dour. This can be mitigated by reducing abstraction before drought use if this can be anticipated and draw water from additional aquifer storage during drought should minimise downstream loss of baseflow. Drought use only should limit reductions in flow.	0	
	2.b. Alter water levels that affect water-based recreation assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0
	2.c. Sever public rights of way or the enjoyment of other land-based recreation or amenity assets?		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0			0

3. Maintain key infrastructure in support of the local economy?	3.a. Impact on strategic transport infrastructure such as airports, major roads and railway lines?	N/A	0	0	No new infrastructure required.	0								
	3.b. Impact on critical services and industries e.g. energy productions and hospitals?	N/A	0	0	No new infrastructure required.									
4. Reduce material consumption and the generation of waste?	4.a. Require significant new construction or demolition of existing assets?	N/A	0	0	No new infrastructure required.	0								
	4.b. Result in higher levels of reuse of waste?	N/A	0	0	No new infrastructure required.									
5. Protect and enhance biodiversity including designated and other important habitats and species?	5.a. Impact on European sites?	N/A	0	0	Impacts to species expected from natural drought conditions, will be exacerbated by abstraction but these effects considered to be small compared to natural drought conditions.	0								
	5.d. Affect the condition of SSSIs, particularly those that have a trend of declining condition?	N/A	0	0	N/A									
	5.b. Lead to the loss or degradation of priority habitats / species or lead to the creation of new priority habitats?	N/A	0	0	N/A									
	5.c. Impact on non-native species?	N/A	0	0	No conservation sites along river or groundwater dependent sites.									
	5.e. Provide opportunities for biodiversity enhancement?	N/A	0	0	N/A									
6. Conserve and enhance landscape character and visual amenity?	6.a. Impact views from public rights of way, designated landscapes, parks or other valued places?	N/A	0	0	No new infrastructure required.	0								
	6.b. Provide opportunities for landscape enhancement?	N/A	0	0	No new infrastructure required.									
7. Minimise the effects of the option / plan on air quality and noise?	7.a. Impact an AQMA?	N/A	0	0	N/A	0								
8. Minimise the carbon footprint of the Company?	8.a. Reduce / increase predicted carbon footprint?	N/A	0	0	Increased abstraction will use more energy but not considered significant as the scheme will only operate every 50 years or so in a drought	0								
	8.b. Maximise the company's resilience to a changing climate?	N/A	0	0	N/A									
9. Adapt to climate change?	9.a. Affect the resilience of the local environment and Affinity Water assets to climate change?	N/A	0	0	N/A	0								
10. Protect and improve surface and groundwater body status?	10. a. Contribute to the naturalisation of water bodies, for example through the removal of artificial structures or channel modifications?	N/A	0	0	N/A	0								
	10. b. Improve water treatment and water quality before it returns to surface water bodies?	N/A	0	0	N/A									
	10.c. Alter water table levels and amount of water within aquifers?	N/A	0	0	Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact									

	10.d. Increase the risk of saline intrusion or other pollution risks to the aquifers?	N/A	0	0	N/A									
11. Avoid adverse impact on surface and groundwater levels and flows?	11.a. Protect or restore adequate levels of flow in rivers and streams?	N/A	0	0	Drought will worsen flow naturally but scheme will make little perceptible difference to the drought related impact	0								
12. Minimise the risk of flooding taking account of climate change?	12.a. Lead to the loss of floodplain and/or potentially increase rates of surface water run-off (e.g. due to additional areas of hard standing)?	N/A	0	0	N/A	0								
13. Conserve and enhance the historic environment, heritage assets and their settings?	13. a. Conserve and/or enhance heritage assets and the historic environment?	N/A	0	0	N/A	0								
	13.b. Alter the hydrological conditions of water-dependent heritage assets, including paleo-environmental deposits?	N/A	0	0	N/A									
14. Minimise loss of soil quality and sterilisation of mineral resources?	14. a. Impact upon best and most versatile agricultural land (ALC grades 1 – 2)?	N/A	0	0	N/A	0								

